Amphibian Engineers in the Southwest Pacific

A Monograph

by

MAJ Joshua P. Bost
US Army

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

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Just prior to World War II, the US Army identified a critical capability gap in conducting amphibious operations. The Army needed the ability to move large forces ashore and sustain them once they arrived. Amphibious Engineer Brigades were created to fill the gap. These forces were designed to execute all facets of amphibious operations to include: transport to the shore, assault of the shore, establishment of the beachhead, road construction, port construction, fire support, and sustainment. These forces supported Joint Force commanders' use of the elements of operational art to extend reach and provide operational flexibility. As in 1941, today's Army has no ability to conduct amphibious operations. As a critical component of the Joint Force, the Army must regain the capability to conduct amphibious operations as the land-focused component most critical to forcible entry operations.

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Name of Candidate: Major Joshua P. Bost

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Approved by:

_____, Monograph Director
Dan C. Fullerton, PhD

_____, Seminar Leader
G. Todd Puntney, LtCol

_____, Director, School of Advanced Military Studies
James C. Markert, COL

Accepted this 25th day of May 2017 by:

_____, Director, Graduate Degree Programs
Prisco R. Hernandez, PhD

Abstract

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Just prior to World War II, the US Army identified a critical capability gap in conducting amphibious operations. The Army needed the ability to move large forces ashore and sustain them once they arrived. Amphibious Engineer Brigades were created to fill the gap. These forces were designed to execute all facets of amphibious operations to include: transport to the shore, assault of the shore, establishment of the beachhead, road construction, port construction, fire support, and sustainment. These forces supported Joint Force commanders' use of the elements of operational art to extend reach and provide operational flexibility. As in 1941, today's Army has no ability to conduct amphibious operations. As a critical component of the Joint Force, the Army must regain the capability to conduct amphibious operations as the land-focused component most critical to forcible entry operations.

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Acronyms

AGF	Army Ground Forces
ADP	Army Doctrine Publication
ADRP	Army Doctrine Reference Publication
ATP	Army Tactics Publication
EAB	Engineer Amphibian Brigade
EAC	Engineer Amphibian Command
EBSR	Engineer Boat & Shore Regiment
ESB	Engineer Special Brigade
JCS	Joint Chiefs of Staff
JP	Joint Publication
LC	Landing Craft
LCM	Landing Craft, Mechanized
LCS	Landing Craft, Support
LCT	Landing Craft, Tank
LCVP	Landing Craft, Vehicle and Personnel
LOC	Lines of Communication
LS	Landing Ship
LST	Landing Ship, Tank
LSD	Landing Ship, Dock
LVT	Landing Vehicle Tank
PT	Patrol Torpedo Boat
SWPA	Southwest Pacific Area
WWII	World War II

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Introduction

> Since men live upon land and not upon the sea, great issues between nations at war have always been decided – except in the rarest of cases – either by what your army can do against your enemy's territory and national life, or else by the fear of what the fleet makes it possible for your army to do.
>
> — Sir Julian Corbett, *Some Principles of Maritime Strategy*

> The big advantage is to the attacker in the amphibious attack. He can pick the point of attack and concentrate heavily on it. The defender cannot be strong at all beaches.
>
> — Brigadier General William F. Heavey, *Down Ramp*

Approaching the beach just before sunrise, hordes of landing craft moving together in unison, young men prepare to assault a defended shore. Naval gunfire rifles overhead to impact two kilometers beyond the boats. Bombers and fighters swarm the skies, preventing enemy penetration to the soon-to-be-established beachhead. The landing craft touch the shore. Men jump out, firing at defensive positions, quickly moving to cover, and establishing a secured beach. Thousands of men will follow with thousands more tons of equipment soon to arrive. The men move quickly to seize objectives beyond the beach and eliminate direct fire against their comrades, still arriving. The US Army is executing another amphibious operation in the Pacific Theater as it moves from New Guinea to the Philippines and eventually to Japan.

The US Army identified a critical capability gap leading up to World War II (WWII). The Army needed to be able to conduct sustained ground combat operations following mass, forcible entry operations. The US Navy prior to WWII concentrated on landing small numbers of Marines on islands to establish bases of operations, but what the Army needed was a mass landing capability that would provide for both the assault force and continued sustainment of the ground force once on land. The answer was to establish Amphibian Engineer Brigades (later designated Engineer Special Brigades), designed and trained by the Army in coordination with the Navy and the Coast Guard. These brigades would serve in both the European and Pacific Theaters with distinction, but the predominance of their action was with General Douglas

MacArthur in the Southwest Pacific Area (SWPA). Amphibian Engineer Brigades provided joint force commanders unmatched capabilities in the SWPA that enabled sustained, decisive campaigns using the elements of operational art.

While operational art was not a doctrinal concept in WWII, its current usage provides a framework to study the use of Amphibian Engineer Brigades in combat in WWII and a capacity to apply lessons learned to modern operations. The Army currently defines operational art as "the pursuit of strategic objectives, in whole or in part, through the arrangement of tactical actions in time, space, and purpose."[1] Operational art is the commander's means to take strategic directives and create a unified campaign consisting of discreet tactical actions in time and space. General MacArthur would rely heavily on his amphibious capability to achieve his objectives using tempo, operational reach, decisive points, and risk.[2] These elements of operational art enhanced flexibility and sustainment of combat operations in the SWPA.

Army Doctrine Reference Publication (ADRP) 3-0 describes elements of operational art as a toolset that provides commanders with the ability to understand, visualize and describe operations in time, space, and purpose. Tempo "is the relative speed and rhythm of military operations over time with respect to the enemy" and provides the commander with the ability to control and sequence tactical actions in time and space to keep the enemy force off balance.[3] Operational reach "reflects the ability to achieve success through a well-conceived operational approach" and balances the competing requirements of endurance, momentum, and protection.[4] Taken together, these elements prevent culmination of friendly forces and provide opportunities

[1] Army Doctrine Reference Publication (ADRP) 3-0, *Operations* (Washington, DC: Government Printing Office, 2016), 2-1.

[2] Ibid., 2-4. The elements of operational art are: end state and conditions, center of gravity, decisive points, lines of operations and lines of effort, operational reach, basing, tempo, phasing and transitions, culmination, and risk.

[3] Ibid., 2-7.

[4] Ibid., 2-9.

to continue to pressure enemy forces with a sustained tempo. A decisive point is a "geographic place, specific key event, critical factor, or function that, when acted upon, allows commanders to gain a marked advantage over an adversary or contribute materially to achieving success."[5] A decisive point is not a center of gravity, but has direct effects on a center of gravity when acted upon. Identification of decisive points ensure unified action against critical enemy capabilities. Risk "is the probability and severity of loss linked to hazards."[6] Risk also refers to the commander's willingness to accept hazards to exploit a weakness in enemy forces, and to the creation of opportunities through a balanced approach to risk awareness and mitigation. Together, these elements of operational art provide a methodology to describe the effective use of Army forces to gain and maintain the initiative in amphibious operations.

When Americans picture combat action in the Pacific theater, most visualize large-scale naval battles and successions of Marine victories. These naval force actions inspired movies, television shows, books, and numerous studies. From Pearl Harbor to Midway to Okinawa, force projection from the sea dominates the visualization of the Pacific. These battles depict massive aircraft carrier and destroyer groups supporting Marine ground combat on small island chains. Such actions dominate the central Pacific. The ideal depiction of combat is Marine amphibious operations executed against well-defended beaches on small islands. These actions took place repeatedly at places like Guadalcanal, Tarawa, and Iwo Jima. News teams rightfully sing the praises of Marine heroes in the Pacific, and the single dominant image of the theater is the raising of the American flag on Mount Suribachi.

This narrative, however, does not consider the many Army actions in the Pacific Theater, and specifically in the Southwest Pacific Area (SWPA).[7] General Douglas MacArthur, operating

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[5] Ibid., 2-5.

[6] Ibid., 2-10.

[7] Louis Morton, *Strategy and Command: The First Two Years, US Army in World War II: The War in the Pacific* (Washington, DC: Center of Military History, 1962), 538. In December of

under significant constraints, executed numerous amphibious assaults against Japanese defenders as he moved up the New Guinea coast to retake the Philippines. General MacArthur suffered from a distinct lack of support throughout the war, owing to both his abrasive leadership style and to being an Army commander in a Navy theater. Navy commanders in other parts of the theater received priority for naval support in shipping, amphibious landing, and aircraft. General MacArthur would need to create his own force, capable of self-sustainment, that could operate apart from the navy command structure. His answer would come from brigades of men, shunned in the European Theater, but fully prepared to execute operations anywhere. These men were Amphibian Engineers.

Many historians and researchers have studied the Pacific Theater. Much of this research is specific to the narrative of naval and Marine Corps dominance of the theater. The Army-specific research that has been conducted glosses over the amphibians and the importance of Army amphibious operations. This research is needed to expand the analysis of Army operations in the Pacific and the contributions of the Amphibian Engineers to the victory over Japan.

The author and historian Ian Toll is producing a multi-volume history of the pacific theater that is representative of the lack of focus on the SWPA. His first two volumes, *Pacific Crucible: War at Sea in the Pacific, 1941-1942* and *The Conquering Tide: War in the Pacific Islands, 1942-1944,* cover a great deal of action that occurred in the Pacific, but focus heavily on Naval and Marine action in the Central and South Pacific Areas.[8] The actions of Army units in SWPA are peripheral to the primary narrative of naval dominance created throughout his works.

1943, the Army had thirteen divisions with 126 battalions in the Pacific Theater. The Marine Corps, at the same time, had three and a half divisions with eighteen and two-thirds battalions.

[8] Ian Toll, *Pacific Crucible: War at Sea in the Pacific, 1941-1942* (New York: W.W. Norton & Co., 2012); Ian Toll, *The Conquering Tide: War in the Pacific Islands, 1942-1944* (New York: W.W. Norton & Co., 2015).

The Center of Military History describes the history of army action in SWPA and throughout the Pacific Theater in its *The War in the Pacific* series. *The Technical Services* series provides more specificity to engineer action in all theaters, but does not create a specific history that follows amphibious engineer utilization. These works collectively create a picture of how the army accomplished the many and varied actions that took place in SWPA as part of a determined campaign plan. Much of the narrative describes strategic decisions that lead to tactical actions on the ground, but the description of combat action focused, rightly, on infantry-centric, ground force actions.

Colonel (Retired) Donald Boose Jr. created an encompassing history of army amphibious operations in his work, *Over the Beach: US Army Amphibious Operations in the Korean War*.[9] As the title suggests, the study focused on amphibious operations in the Korean War. It began, however, with a complete history of the development of Amphibious Engineer Brigades in 1943, describes case studies for their actions in the Pacific and European Theaters, and serves as a rich source of other resources for amphibious development.

What none of these works can do, however, is describe the specificity and importance of Amphibious Engineer Brigades to the success of Army operations in WWII. Amphibian engineers provided commanders a unique capability that allowed for maximized use of what are now the elements of operational art. Narrowing the focus to the SWPA provides a framework to study the implementation and long-term usage of the Amphibious Engineer Brigades to gain and maintain contact with the enemy and sustain the force once on shore. This was not the case in other theaters.

[9] Donald Boose Jr., *Over the Beach: US Army Amphibious Operations in the Korean War* (Fort Leavenworth, KS: Combat Studies Institute Press, 2008).

Origins of the Amphibians

Interest in army amphibious capability began about a week after Pearl Harbor with engineer interest in the landing ship tank (LST) that the Navy, at the time, wanted no part of.[10] The Army was specifically looking at requirements for amphibious operations in support of large-scale ground combat in both the European and Pacific Theaters, while the Navy focused on fleet actions involving the blue water navy. The Army was in a fight with the Navy from the inception of amphibious units for control of maritime craft. An agreement that Army units would execute shore-to-shore assaults only while the Navy would control all ship-to-shore craft initially appeased both sides. As a part of the agreement, Army units could only operate landing craft (LC) of less than 100 feet which required transport and launch from naval ships. The Navy, therefore, retained control for landing ships (LS). These were longer range vessels for transporting larger numbers of troops and supplies directly to beaches.[11] The Army would use the landing craft, vehicle or personnel (LCVP) and the landing craft, mechanized (LCM) along with the smaller landing vehicle, tank (LVT) and DUKW.[12]

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[10] Chief of Combined Operations, *Combined Staff Operations Staff Notebook* (Combined Operations Command, 1945), 100; Norman Friedman, *US Amphibious Ships and Craft: An Illustrated Design History* (Annapolis, MD: Naval Institute Press, 2002), 8, 104. The LST was a 327 foot long landing craft designed with a bow opening to eject large quantities of armored vehicles. Its capacity was up to 2,200 tons and could carry up to 20 Sherman tanks. At a cruising speed of 10 knots, the LST could travel anywhere from 8,000 to 19,600 miles depending on load. The US Army was assisted by the British in getting the LST designed and built as General George Marshal was much more receptive to the idea than anyone in the Navy. The British, like the Army, needed a mass amphibious capability to move large, mechanized forces quickly to the European continent. The Navy wanted no part of a ship that was designed to be temporarily immobilized so close to shore, serving as a target for enemy attack.

[11] William Heavey, *Down Ramp: The Story of the Army Amphibian Engineers* (Nashville, TN: The Battery Press, 1988), 11; Gordon Rottman, *US World War II Amphibious Tactics: Army & Marine Corps, Pacific Theater* (Osceola, WI: Osprey Publications, 2004), 31.

[12] Rottman, *US World War II Amphibious Tactics*, 41; Engineer Amphibian Command, *Engineer Amphibian Command Tentative Training Guide No. 1, Engineer Amphibian Troops: General* (Camp Edwards, MA, 1943), 13-27; Friedman, *US Amphibious Ships and Craft*, 18-26,

Inter-service rivalry would be a continuous fight throughout WWII. The Navy initially gained service acceptance as the lead element for all amphibious development and training. Army leadership, however, became disillusioned by this agreement late in 1942. Marines focused on daylight assaults of small islands with little deception and massive naval preparatory fires, while the Army wanted to focus on nighttime assaults using deception for sustained combat on large land masses. Due to these requirements, Army Ground Forces (AGF) proposed establishment of an army amphibious development and training center specifically focused on amphibious assault against the continent of Europe. AGF received approval from the Joint Board to establish the Engineer Amphibian Command (EAC) at Camp Edwards, MA in June 1942 with the task of training eight brigades comprised of boat and shore regiments with additional enablers.[13]

It was not surprising that the engineers should be tasked with the mission for amphibious operations. The Corps of Engineers had served as the army proponent for riverine and boat operations since the Civil War and the engineer school conducted assessments for possible amphibious employment as far back as 1939, developing plans of employment for engineers in amphibious operations and establishment of far shore activities.[14] One of the first requirements developed by the fledgling engineer headquarters was a mission statement to drive growth of this

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80, 93; Chief of Combined Operations, *Combined Staff Operations Staff Notebook,* 99. The LCVP is a "thirty-six foot shallow draft, ramp loading, vehicle/personnel craft." It had a carrying capacity of up to 10,100 lbs or 36 personnel. It could travel at a speed of 9.6 knots with a radius of up to 105 nautical miles; The LCM was a "fifty-foot shallow draft, ramp loading, twin-screw, heavy vehicle carrying landing craft." It could transport up to 60,000 lbs or 60 personnel. It could travel at a speed of 8 knots with a radius of up to 275 nautical miles. The DUKW (an acronym provided by the manufacturer) was a two and a half ton amphibian truck built on a wheeled six by six platform and powered by a six-cylinder engine. It carried up to 5,000 lbs. The LVT, also known as an Alligator or amphibian tractor, was a track driven vehicle capable of holding up to 4,500 lbs of cargo.

[13] Boose, *Over the Beach*, 35-37.

[14] Office of the Chief Engineer, General Headquarters Army Forces, Pacific, *Engineers of the Southwest Pacific 1941-1945 Volume IV: Amphibian Engineer Operations* (Washington, DC: United States Government Printing Office, 1959), 16-17.

crucial capability. The original mission statement of the amphibian engineer units was given as: "transporting troops of the combat unit to which it is attached… control and improvement of the far shore, debarkation and movement of supplies to troops beyond the beach proper and evacuation and control of landing craft, casualties, and prisoners of war from the far shore."[15] This mission would greatly expand following combat experience in the Pacific Theater.

The establishment of the EAC provided the Army the ability to develop its own amphibious capability and doctrine. Engineer amphibian troops would serve to cross any body of water, be it sea, lake, or river, to position friendly forces inland for further combat operations. The primary element for the engineers would be the engineer amphibian brigade. The brigade initially consisted of two regiments, one boat regiment and one shore regiment. Integrating these two capabilities into one unified element proved much more effective for command and control. The final makeup of the brigade consisted of three identical regiments each comprised of a boat battalion and a shore battalion [see figure 1 next]. The basic combat element would be the "boat-company-plus-shore-company" which was a self-sufficient entity with additional support attachments from across the brigade.[16] The boat-company-plus-shore company could support one battalion landing team, an amphibian regiment supported a regimental landing force, and an amphibian brigade supported an entire division.[17]

[15] Heavey, *Down Ramp*, 3; *Engineer Amphibian Troops: General*, 3. The primary missions of the amphibians are: 1. Water Transport, 2. Organization of the Far Shore, 3. Evacuation of Personnel and Equipment, and 4. Re-supply.

[16] *Engineer Amphibian Troops: General*, 13-17; Friedman, *US Amphibious Ships and Craft*, 5.

[17] *Engineer Amphibian Troops: General*, 13-17; Friedman, *US Amphibious Ships and Craft*, 44.

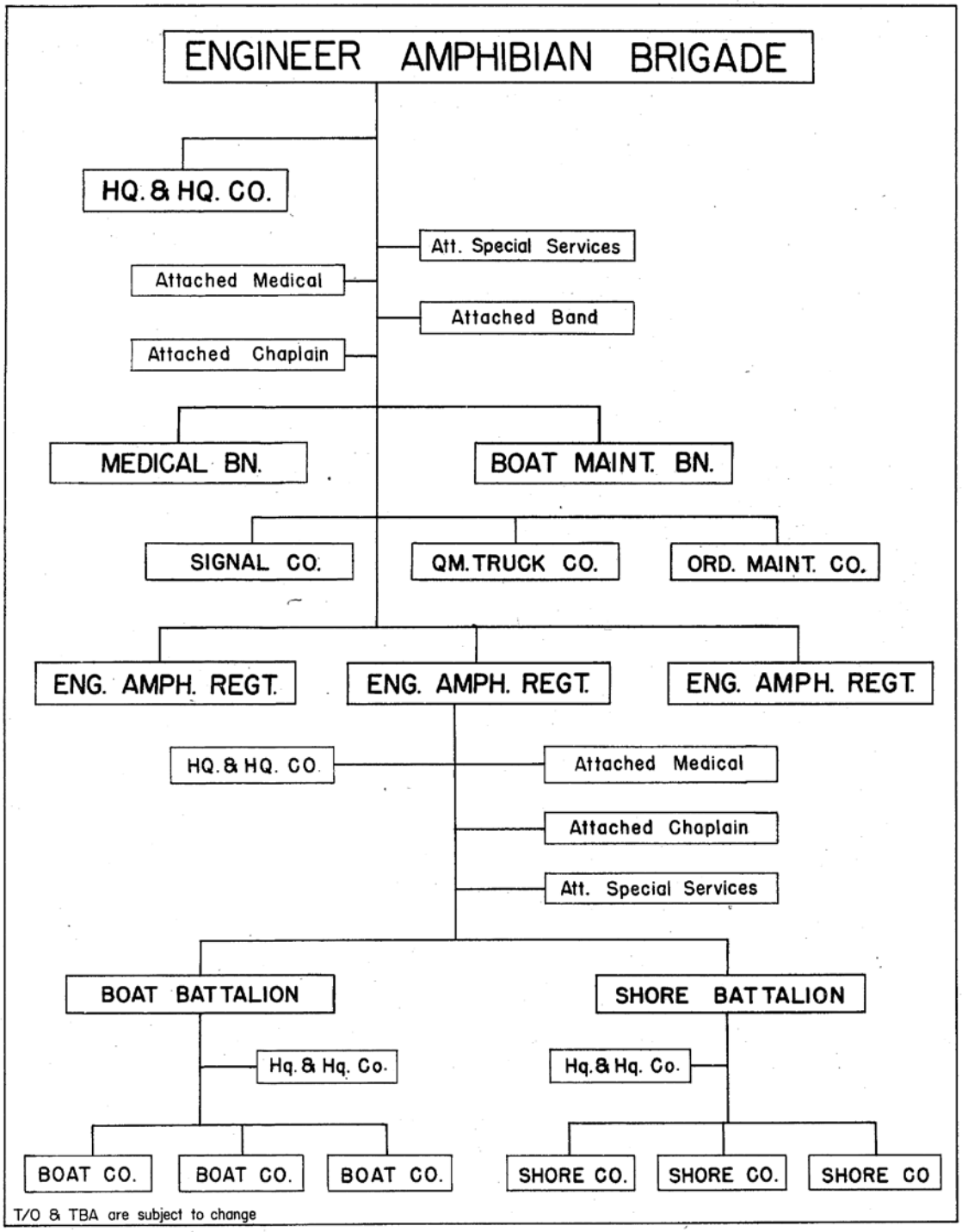

Figure 1. Engineer Amphibian Command, *Engineer Amphibian Command Tentative Training Guide No. 1, Engineer Amphibian Troops: General* (Camp Edwards, MA, 1943), 45.

Amphibious engineer brigades executed more than just transport. The amphibians conducted anti-air and anti-ship operations, defended harbors, beachheads, and airports, organized the far shore, constructed facilities and infrastructure, conducted combat operations, and sustained forces on land. They assaulted the beach, defended the beach, received personnel and equipment, and operated ports and constructed all facilities from ports to airports.[18] The brigade supported an infantry division in all operations from embarkation, transportation, organization of the beachhead, and logistical support ashore.[19] Providing logistical support ashore was a key change to the tasks of the amphibians. Not only were they required to bridge the gap, but they had to maintain the bridge and sustain everyone across it.[20] Once in theater, the brigades would additionally develop an organic fires capability to assist in direct and indirect fire onto defended beaches.

Initial trials of the amphibians were successful, but service rivalries prevented the employment of the 1st Engineer Amphibian Brigade in Europe. The Navy held a strong belief that they were the only service that should be driving boats for amphibious operations, especially since senior leadership determined the initial plan for a shore to shore assault across the English Channel was too dangerous. The 1st Engineer Amphibian Brigade was relegated to truck duty in England instead of preparing for the cross-channel invasion.[21] Before the brigades could prove

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[18] *Engineer Amphibian Troops: General,* 13-17; Friedman, *US Amphibious Ships and Craft,* 4-6; Office of the Chief Engineer, *Amphibian Engineer Operations,* 18; Heavey, *Down Ramp,* 4. The army at the time lacked men with experience. Men would be needed to "operate boats, prepare beaches, and load and unload material needed for support of combat troops." Men were recruited from boat specific backgrounds including direct commissioning officers from "yacht clubs, boating organizations, maritime publications, etc." These first recruits were professional boat handlers, but many lacked the acumen for prolonged combat.

[19] Office of the Chief Engineer, *Amphibian Engineer Operations,* 19.

[20] Ibid., 20.

[21] Heavey, *Down Ramp,* 3.

themselves in combat, the Navy wanted to turn all of the engineer special brigade troops into stevedores with shore duty only.[22]

Early amphibious operations occurred during the development of Army amphibian capability, but there were few lessons learned that could apply to the amphibian engineers. While the United States conducted amphibious operations in 1942 (Guadalcanal, the Aleutians, North Africa), none could replicate the conditions that the amphibious engineer brigades would encounter, and there was very little cross-talk between theaters or services. [23]

The Southwest Pacific Theater, meanwhile, suffered from a distinct lack of service support, especially from the Navy. General Hugh Casey, Chief Engineer to Southwest Pacific Forces, in a memo to General MacArthur highlighted the imperative of organic amphibious engineers:

> The availability of integrated units wholly equipped and capable of transporting our divisions by water will materially improve the maneuverability of our forces throughout the present and prospective areas of operations. It will afford an independence of operation and unity of control not otherwise attainable if dependence had to be placed on the Navy for such movements. The capacity to conduct outflanking maneuvers against the enemy would prove a constant threat to him and vitally affect his dispositions and his ability to defend the dispersed areas now held by him.[24]

General MacArthur thus requested that the remaining Engineer Amphibian Brigades move immediately to the Southwest Pacific Theater. He would eventually receive three brigades, the 2nd, 3rd, and 4th, which would be re-designated Engineer Special Brigades (ESBs) as partial appeasement to naval authorities who thought that they should have control of all amphibious units.[25] The 2nd Engineer Special Brigade would arrive in Australia in early 1943 and prepare for immediate offensive operations.

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[22] Karl Dod, *The Corps of Engineers: The War Against Japan, US Army in WWII, the Technical Services* (Washington, DC: Center of Military History, 1987), 246.

[23] Boose, *Over the Beach*, 41-43.

[24] Office of the Chief Engineer, *Amphibian Engineer Operations*, 30.

[25] Heavey, *Down Ramp,* 6.

Case Study 1 - Operation Cartwheel

Operation Cartwheel was a joint campaign designed by both South Pacific Command and Southwest Pacific Command to be executed simultaneously along multiple lines with the final objective of seizing the key Japanese base at Rabaul. Original direction from the Joint Chiefs called for Operation Cartwheel to: first capture Tulagi and Guadalcanal in the Solomon Islands, second capture the remainder of the Solomon Islands plus Lae and Salamaua, and finally seize Rabaul itself (see Map 1). Rabaul was the largest Japanese base in the South Pacific that served as the base of operations for all Japanese air, sea, and ground operations from New Guinea through the Solomons and into the Marianas. Seizing Rabaul was critical to the allied forces in the Pacific to protect lines of communication and to protect Australia and New Zealand.[26] D Day was set for June 30, 1943.[27] The final revised plan for Cartwheel called for seizure of Woodlark and Kiriwina, then Lae, Salamaua, Finschhafen and Madang, before moving on to Bougainville, Cape Gloucester and Arawe, and finally Rabaul.[28]

Second Engineer Special Brigade arrived in the Pacific Theater in March 1943 in preparation for Operation Cartwheel. The brigade got to work immediately in creating its own boat assembly plant in Cairns, Australia to build LCMs and LCVPs because the Navy did not have enough room in their ships to transport them fully constructed.[29] It would be months before the ESBs could construct enough landing craft to constitute a full brigade, so any initial usage of the brigades would have to be at the sub-regimental landing team level.

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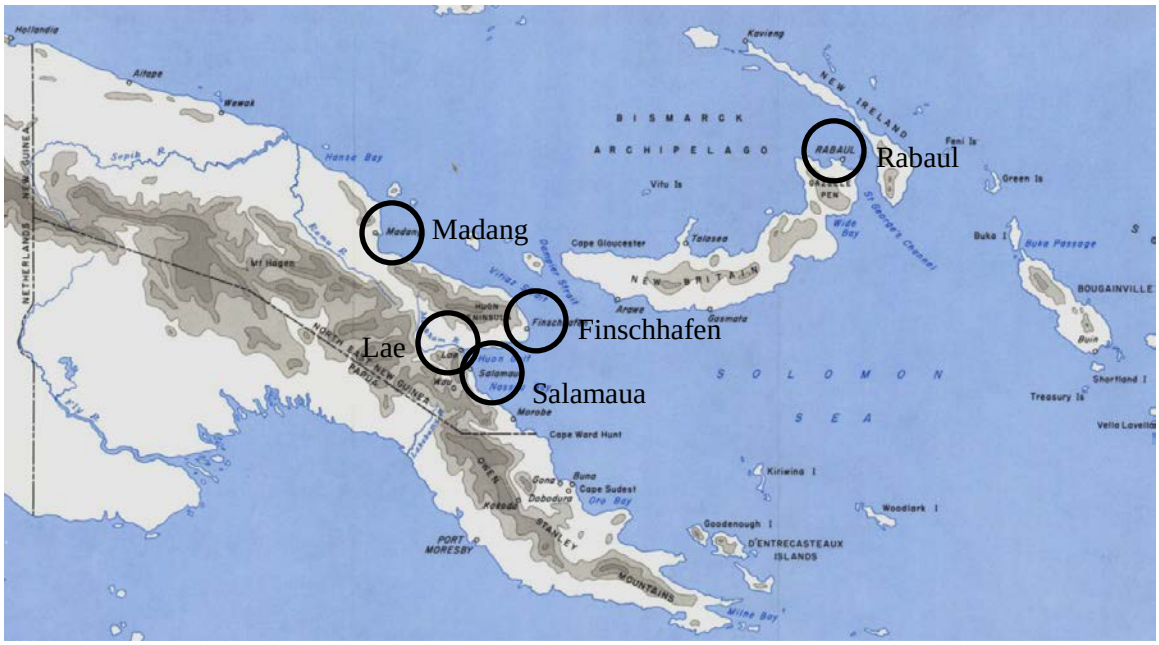
[26] John Miller Jr., *Cartwheel: The Reduction of Rabaul, US Army in World War II: The War in the Pacific* (Washington, DC: Center of Military History, 2006), 1-5.

[27] Ibid., 49.

[28] Ibid., 27.

[29] Geoffrey Perret, *There's a War to be Won: The United States Army in WWII* (New York: Random House, 1991), 254.



Map 1. John Miller Jr., *Cartwheel: The Reduction of Rabaul, US Army in World War II: The War in the Pacific* (Washington, DC: Center of Military History, 2006), 24.

General MacArthur developed the Elkton Plan (eventually Elkton III) as the primary means for Southwest Pacific Area forces to execute their portion of Operation Cartwheel.[30] The first requirement for operations against Rabaul was clearance of Japanese forces in New Guinea. Operation Postern was created as a sub-operation as part of Elkton III as a series of coastal seizures along the New Guinea Coast, consisting of operations to take Salamaua-Lae-Finschhafen-Madang and seize the Huon Peninsula. The first operation of Postern was the seizure of Lae, but lack of naval support meant moving Engineer Special Brigade elements to a secure near-shore location to support operations against Lae. Salamaua served as an intermediate objective since it was only sixty miles from the secure port at Morobe, thirty-five miles from Lae and lightly defended.[31] Seizing Salamaua would put ground forces in position to execute an operation against Lae in quick succession. General MacArthur also envisaged Salamaua as a

[30] Office of the Chief Engineer, *Amphibian Engineer Operations*, 57.

[31] Office of the Chief Engineer, *Amphibian Engineer Operations*, 58-59.

diversionary attack that would pull enemy forces away from the more defensible, primary objective at Lae.[32] To execute Operation Postern, New Guinea Force would be the primary executor, which included the US I Corps (consisting of the 32nd and 41st Infantry Divisions) and the 1st Australian Corps (consisting of the 7th and 9th Australian Divisions).[33] Although the makeup of the task force would consist of up to two corps and four divisions, these first tactical actions as part of Operation Postern would be limited by the amount of landing craft available.

Salamaua: June 1943

The landings at Nassau Bay for the seizure of Salamaua occurred at the same time as other Elkton elements were converging on their objectives in Woodlark and Kiriwina, achieving simultaneity and presenting the enemy commander with multiple dilemmas.[34] Nassau Bay would be the first use of army amphibious troops in WWII. The plan called for shore-to-shore movement along the coast from Morobe with amphibious assault at Nassau Bay in support of an overland attack north to seize Salamaua (see Map 2).[35]

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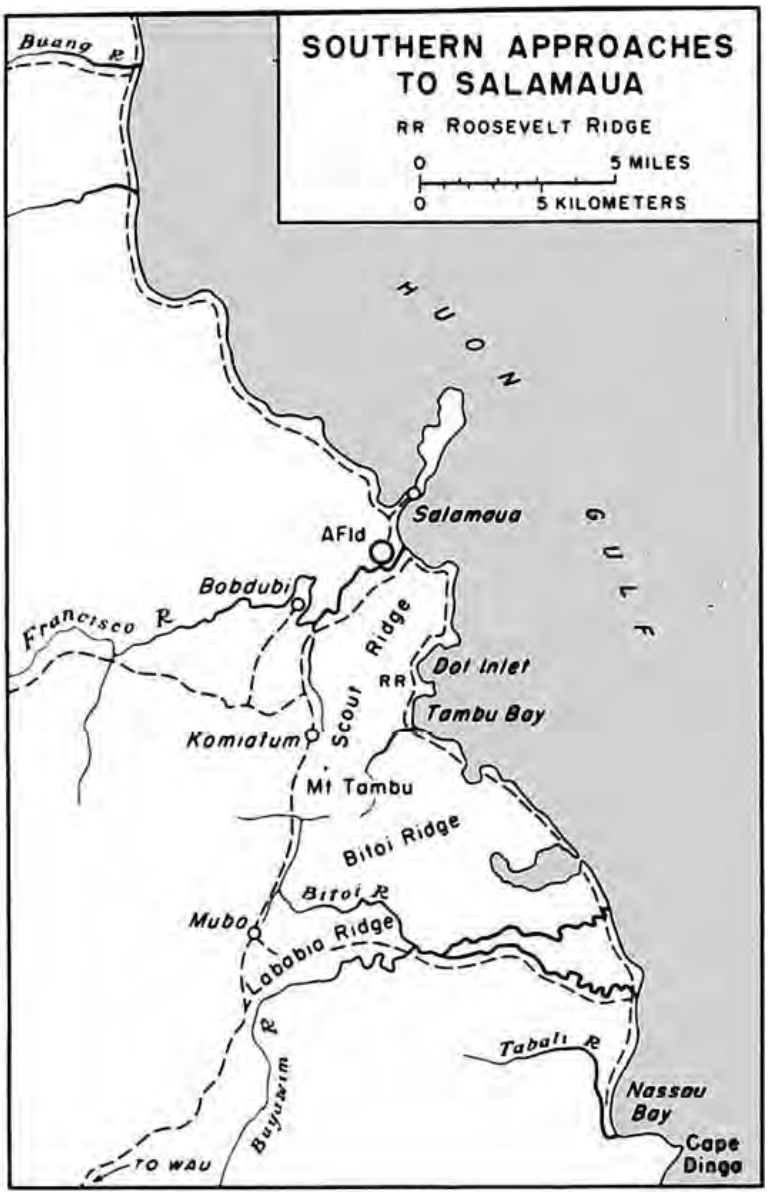
[32] Douglas MacArthur, *Reminiscences* (Annapolis, MD: Naval Institute Press, Blue Jacket Books, 2001), 177.

[33] Office of the Chief Engineer, *Amphibian Engineer Operations*, 57; Geoffrey Perret, *Old Soldiers Never Die: The Life of Douglas MacArthur* (Holbrook, MA: Adams Media Corporation, 1996), 432. General MacArthur created task forces with direct reporting to GHQ as a way to get around assigning American forces to General Arthur Blamey, the Australian Land Forces Commander.

[34] Office of the Chief Engineer, General Headquarters Army Forces, Pacific, *Engineers of the Southwest Pacific 1941-1945 Volume I: Engineers in Theater Operations* (Washington, DC: United States Government Printing Office, 1947), 102.

[35] Miller, *Cartwheel*, 60.



Map 2. John Miller Jr., *Cartwheel: The Reduction of Rabaul, US Army in World War II: The War in the Pacific* (Washington, DC: Center of Military History, 2006), 62.

The 532nd Engineer Boat and Shore Regiment (EBSR), from the 2nd Engineer Special Brigade (ESB) was organized to support the assault at Nassau Bay in support of the 162nd Regimental Combat Team. This element consisted of approximately 500 personnel from across the 2nd ESB, as many elements were still enroute to New Guinea from Australia. The equipment available for this first assault were thirty-five LCVPs, two LCMs, and three captured Japanese

barges. H hour was set for 2300 on June 29. The plan called for boarding of troops at Morobe at 1900 and traveling fifty-six miles to Nassau Bay. The shore party would be provided by an Australian infantry platoon that had left a number of days prior via an overland route. It was intended to land forces on a single beach in three waves, guided by navy patrol torpedo (PT) boats.[36]

The first landing at Nassau Bay went poorly. The PT boat escort outran its EBSR craft, lost contact with them and misguided them to the landing sites.[37] The third wave of boats became so separated that it overran the beach by many miles and had to turn back to Morobe without landing. High winds and low visibility caused additional difficulties. All elements of the first and second waves reached shore safely despite the difficulties. Twenty-one of the twenty-two LCVPs and one LCM were crashed on the beach due to twelve foot breakers that swamped the engines and were unable to be recovered, but 770 combat troops were safely ashore.[38] The roar of the boats on the first wave held off the Japanese counterattack because the defenders thought that tanks were being landed.[39]

Japanese resistance began at dusk on D Day (June 30) with shipwrecked ESB elements providing critical perimeter defense and reinforcement to the beachhead, especially as Australian elements were running out of ammunition. Reinforcements and resupply arrived at dawn on July 1 and the defenders successfully forced back the opposition. Elements of the shore company established the beachhead on the 1st under intense enemy fire. This critical operation supported

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[36] Office of the Chief Engineer, *Amphibian Engineer Operations,* 62-64.

[37] Miller, *Cartwheel*, 64.

[38] Office of the Chief Engineer, *Amphibian Engineer Operations,* 65-67; Heavey, *Down Ramp*, 61; Dod, *The Corps of Engineers: The War Against Japan*, 247; Office of the Chief Engineer, General Headquarters Army Forces, Pacific, *Engineers of the Southwest Pacific 1941-1945 Volume VIII: Critique* (Washington, DC: United States Government Printing Office, 1950), 102.

[39] Heavey, *Down Ramp,* 62.

daily resupply from Morobe and Mageri Point to overland forces attacking to seize Mubo Aerodrome just west of Nassau Bay until July 10. Afterward, overland forces began moving from Nassau Bay north to clear Japanese elements in the vicinity of Salamaua itself. This marked a transition for the EBSR, as well, that converted Nassau Bay from a receiver of supplies to a supporter of additional coastal operations.[40]

The 532nd would continue to sustain forward ground elements out of Nassau Bay to beaches both north and south of Salamaua through July and early August.[41] Boats carried critical reinforcements and resupply and returned with sick and wounded. These operations were critical in the success of operations at Nassau Bay. The lack of air superiority precluded naval support north of Milne Bay.[42] These forward resupply operations out of Nassau Bay to beaches in vicinity of Salamaua were averaging up to seventy-five tons of supplies per night under heavy enemy fire.[43] These resupply runs provided critical capabilities to ground units that would not have been able to continue otherwise.

In addition to resupply, shore engineers conducted critical activities in road, building, and bomb shelter construction, as well as installing and maintaining critical communications infrastructure. By the time Salamaua fell, the 532nd was transporting an average of 300 tons of supplies a day. In the seventy-four days of the operation, the EBSR had conducted 3,000 landings, transported 10,000 US and Australian troops, and carried over 15,000 tons of cargo.[44]

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[40] Office of the Chief Engineer, *Amphibian Engineer Operations*, 68-71.

[41] Ibid., 74.

[42] Heavey, *Down Ramp*, 62-63.

[43] Office of the Chief Engineer, *Engineers in Theater Operations*, 105.

[44] Office of the Chief Engineer, *Amphibian Engineer Operations*, 80-81; Office of the Chief Engineer, *Engineers in Theater Operations*, 106.

Lae: September 1943

Plans for the seizure of Lae had been ongoing since May 1943, but with a major push in August during the Salamaua operations. Planners expected up to 20,000 enemy troops near Lae in well prepared defenses and that any landing would be significantly opposed.[45] The plan called for an amphibious assault of forces east of Lae, an airborne operation to drop forces west of Lae, and an overland movement of forces moving north from Salamaua. Amphibious forces for the operation would consist of 9th Australian Division supported by Task Force 76, a part of the VII Amphibious Force (US Navy), which would include the 532d EBSR. The EBSR was not capable of conducting complete shore-to-shore support of 9th Division for Lae because of the distances, so VII Amphibious Force would transport the initial assault force and serve as an intermediate sustainment source throughout the operation. [46]

Final plans called for D Day of September 4, 1943 and H Hour of 0630. Landings would occur at two beaches, Red and Yellow, with Red Beach being the primary landing beach at a point about fourteen miles from Lae and Yellow Beach serving to protect the flank of Red Beach (see Map 3).[47] Beaches identified for the Lae assault consisted of twenty yard wide hard pack sand that ended abruptly at mangrove swamps, though planners could not tell the extent to which the swamps would affect beachhead operations.[48] Seventh Amphibious Force for Lae constituted 17,000 troops and 12,000 tons of supplies aboard 156 ships and other craft. Prior to the operation,

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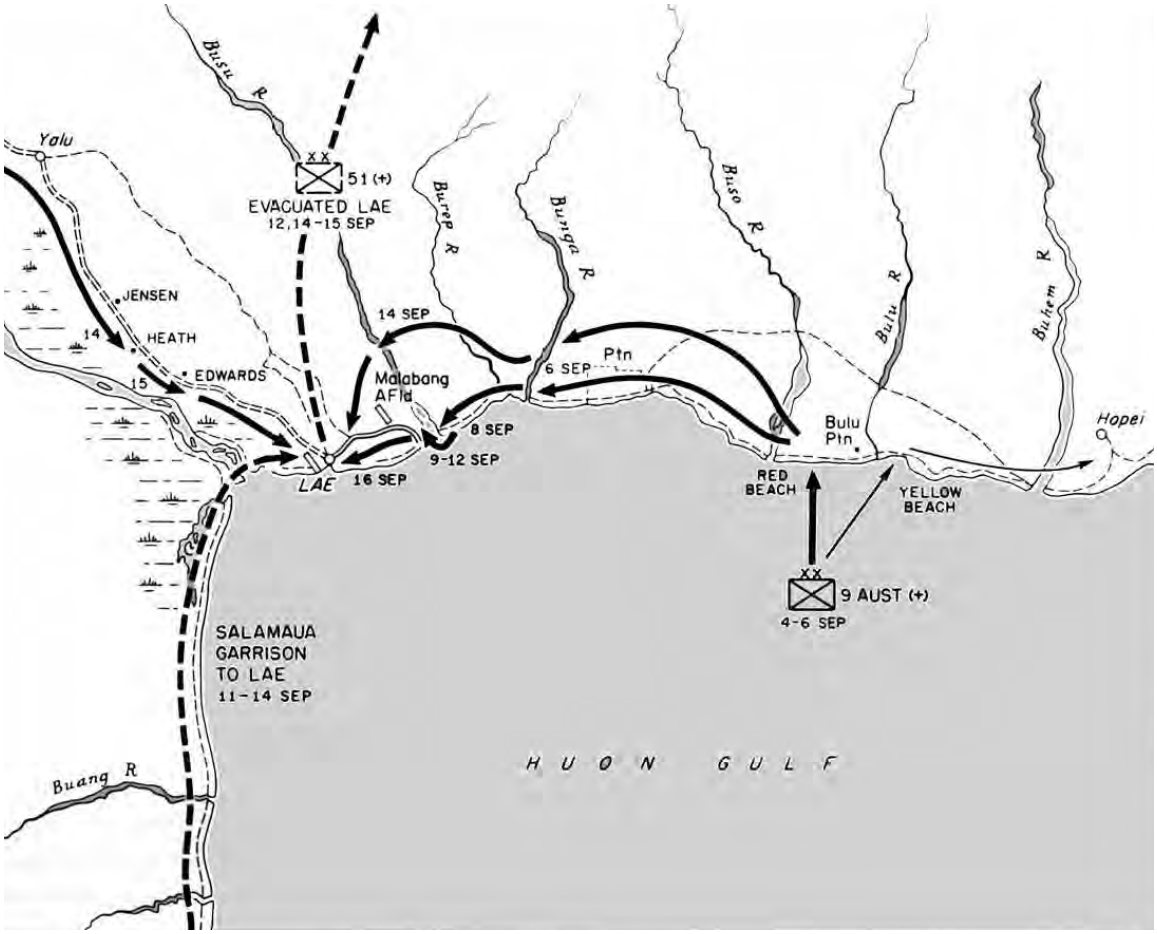
[45] Office of the Chief Engineer, *Engineers in Theater Operations*, 106.

[46] Office of the Chief Engineer, *Amphibian Engineer Operations* (Washington, DC: United States Government Printing Office, 1959), 83-84; Miller, *Cartwheel,* 192. LCVPs would be the limiting factor for determining maximum distances for shore to shore operations. The distance from Salamaua to Lae was 35 miles which would have required refueling immediately after unloading troops and equipment.

[47] Office of the Chief Engineer, *Amphibian Engineer Operations,* 85.

[48] Ibid., 91.

there was serious concern from the Navy about the EBSR's ability to support operations due to perceived failure of landing at Nassau Bay.[49]



Map 3. John Miller Jr., *Cartwheel: The Reduction of Rabaul, US Army in World War II: The War in the Pacific* (Washington, DC: Center of Military History, 2006), 205.

The engineers would provide 1,300 troops and fifty-seven landing craft (forty-four LCVPs, ten LCMs, three LCSs and four Navy LCTs) on a seventy-five-mile movement from Morobe to Red Beach.[50] They would be primarily responsible for all shore operations within 400

[49] Daniel Barbey, *MacArthur's Amphibious Navy: Seventh Amphibious Force Operations 1943-1945* (Annapolis, MD: United States Naval Institute, 1969), 75-76.

[50] *Engineer Amphibian Troops: General*, 13; Friedman, *U.S. Amphibious Ships and Craft*, 104, 226; *Combined Operations Staff Notebook*, 100. LCS, Landing Craft Support. A fire support platform used to provide assaulting units with direct and indirect fires from close range. LCS had three categories: small, LCS(S); medium, LCS(M); and large, LCS(L). The reference did not describe which version was used in this assault, but was most likely an LCS(S) due to the

yards of the beach, loading and unloading of naval craft, and road construction in support of ground force movement from the beachhead to Lae.[51] The Lae landing would be the first opportunity the 532nd would have to use its own scouts, mark its own landings, and develop its own beachhead, controlling all portions of far shore activities for the duration of the mission.[52]

Engineer scouts landing in the first wave at Lae identified that the beach was ideal for offloading with a gentle slope and a shelf at ten to fifteen feet from shoreline, but that swamps would make expansion of the beachhead difficult.[53] Rain would add to the issue, creating a quagmire that required significant construction effort to fill and corduroy roads and dump sites.[54] The EBSR shore party offloaded LSTs at Red Beach in two and a half hours, but significant delay in offloading LCTs by an Australian stevedore party was the beginning of friction between the EBSR and navy elements throughout the operation. The small beach caused massive pileups of troops and equipment once the craft unloaded. Dump sites and roads inland continuously sank into the swamp, resulting in poorly concealed, easily targetable dumps and shore buildings that were constructed too close to shore.[55]

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improbability that the navy would have released the larger vessels to the EBSR for execution. LCS(S) carried two four-inch rocket launcher systems and two .50 caliber machine guns. LCT, Landing Craft Tank was 120 feet long capable of carrying 150 tons of equipment, travelling at 8 knots with a radius of 1,200 nautical miles.

[51] Office of the Chief Engineer, *Amphibian Engineer Operations,* 92-93; Heavey, *Down Ramp,* 63.

[52] Miller, *Cartwheel,* 204.

[53] Office of the Chief Engineer, *Amphibian Engineer Operations,* 97.

[54] Heavey, *Down Ramp,* 63; Office of the Chief Engineer, *Amphibian Engineer Operations,* 99; Office of the Chief Engineer, *Engineers in Theater Operations,* 106.

[55] Office of the Chief Engineer, *Amphibian Engineer Operations,* 100-03. The shore plan called for each ground element to provide a work detail of around 100 men per ship. The work force never materialized and the EBSR shore element was required to unload almost entirely by themselves. Later plans would include putting the work party on the ship they were required to unload and attaching work parties to the EBSR until unloading was completed.

By the end of D Day, however, roads were constructed, dumps were moved inland, communication was established, and the beachhead was expanded about one-third of a mile inland. The EBSR was fully prepared to receive the second wave of ships at 2300.[56] The 532nd EBSR had assisted in getting ashore 8,000 men and 1,500 tons of equipment in four hours with minimal incidents.[57]

Inland operations hit a snag on September 5 (D plus 1) when the swamps and dense jungle slowed operations to such an extent that an alternative was required for crossing of the Buiem River. Engineer Special Brigade scouts were sent out to find an alternative and quickly identified the first of a number of new sustainment beaches to keep pace with troops moving down the shoreline toward Lae. Weather continued to degrade over the next several days creating a situation that was now completely untenable for overland resupply, creating a shift in operations from beachhead improvement and overland road construction to a primary shore-to-shore resupply and sustainment effort.[58] This shift required an increase in boats to support sustainment from ten to twenty-one LCMs and from forty-four to sixty LCVPs.[59]

Elements of the 26th Australian Brigade encountered heavy resistance trying to conduct a river crossing of the Busu River on September 8. After initial elements assaulted across the river and established a small bridgehead, follow-on units failed to cross due to enemy resistance, resulting in an isolated unit in enemy held territory. Landing craft were enlisted to ferry men and equipment from Red Beach to a beachhead established at the mouth of the Busu allowing the

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[56] Ibid., 104; Boose, *Over the Beach,* 251.

[57] Barbey, *MacArthur's Amphibious Navy,* 79.

[58] Office of the Chief Engineer, *Amphibian Engineer Operations,* 105-07. The first at Singaua Plantation called H-2.

[59] Heavey, *Down Ramp,* 64. New boats continued to flow from the plant in Cairns to Morobe for forward movement to areas of operation as fast as they could be constructed.

EBSR to relocate 1,500 troops plus supporting artillery to the rear of the defending Japanese force in less than forty-eight hours.[60]

Requirements to sustain the 9th Australian Division overland created conflict with the Navy running nightly resupply to Red Beach via LCTs. The Navy wanted these craft unloaded within two and a half hours of beaching, but diversion of personnel for sustainment of the 9th caused a serious degradation in unloading. Eventually, the 9th Australian Division had to supply 950 of its own people to reinforce EBSR efforts and speed up the process. By September 12, 532nd EBSR had unloaded 16,500 troops, 688 vehicles, and over 4,500 tons of supply.[61] Lae would fall well ahead of schedule on D+12.

Finschhafen: September 1943

The quick capture of Lae led to accelerated planning and movement toward the seizure of Finschhafen, which would take the Japanese forces there by surprise.[62] The operation was executed on four days notice with a 550-man element using ten LCMs, and fifteen LCVPs moving elements from Red Beach at Lae to Scarlet Beach at Finschhafen (see Map 4).[63]

The plan was to have elements of 532nd EBSR transport and sustain 20th Brigade of the 9th Australian Division to a beach about six miles north of Finschhafen. In the end, a contingent of the Australian naval craft was used to supplement amphibious forces to assist in transporting troops for the initial assault. To alleviate delays in downloading LSTs, each LST would transport

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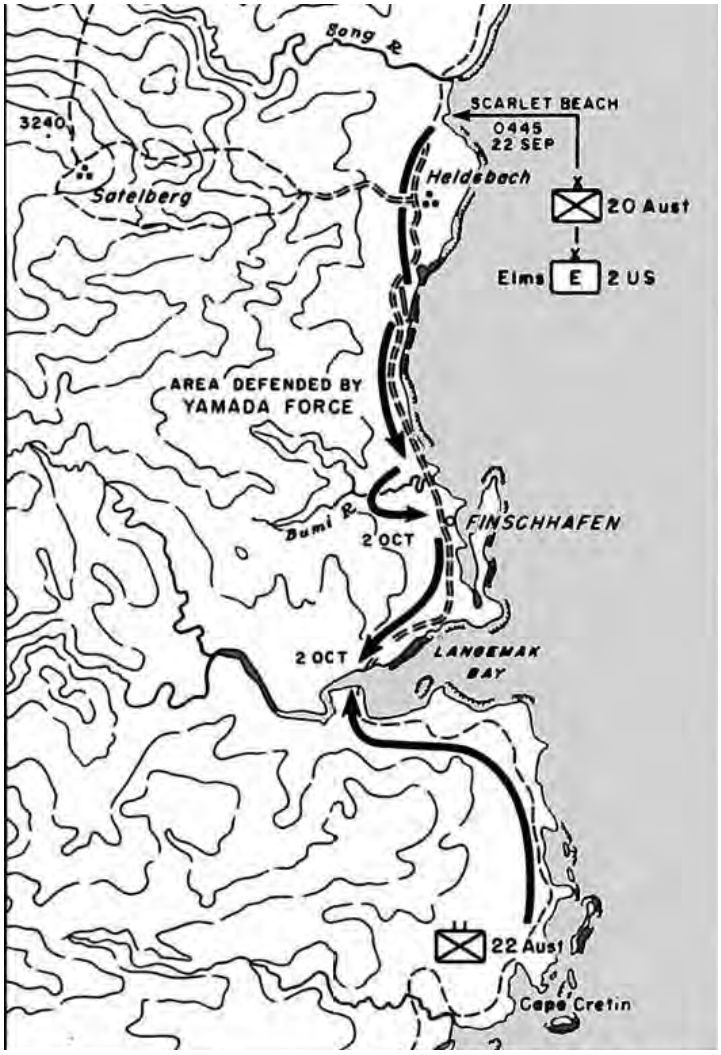
[60] Office of the Chief Engineer, *Amphibian Engineer Operations*, 108-09; Heavey, *Down Ramp*, 64; Robert Eichelberger, *Our Jungle Road to Tokyo* (New York: Viking Press, 1950), 65.

[61] Office of the Chief Engineer, *Amphibian Engineer Operations*, 111; Dod, *The Corps of Engineers: The War Against Japan*, 252; Eichelberger, *Our Jungle Road to Tokyo*, 75; Heavey, *Down Ramp*, 64. General Heavey puts the count at 12,000 troops and 10,000 tons of supplies.

[62] Office of the Chief Engineer, *Amphibian Engineer Operations*, 115; Office of the Chief Engineer, *Engineers in Theater Operations*, 111.

[63] Heavey, *Down Ramp*, 65; Office of the Chief Engineer, *Amphibian Engineer Operations*, 119. Scarlet Beach was used to differentiate it from Red Beach which was still active, though the term Scarlet Beach was not doctrinal.

a 100-man stevedore party made up of members of the 9th Australian Division to conduct unloading. D Day was set for September 22, 1943 with H Hour at 0445.[64]



Map 4. John Miller Jr., *Cartwheel: The Reduction of Rabaul, US Army in World War II: The War in the Pacific* (Washington, DC: Center of Military History, 2006), 205.

A massive naval bombardment prior to the assault scattered the defending Japanese forces resulting in a lightly contested initial assault. Low visibility, combined with bombardment, caused problems with the initial wave sighting and resulted in misidentifying the beach, but the

[64] Office of the Chief Engineer, *Amphibian Engineer Operations*, 115-20; Barbey, *MacArthur's Amphibious Navy,* 91. Number was initially 200, but had to be lowered to allow for larger cargo load.

problem was quickly rectified by EBSR scouts. The LST load-crew plan worked well as all waves and ships were unloaded and disembarked by 0930, well ahead of schedule. The stevedore plan provided timely unloading and shore party operations were greatly assisted by the open, hard-pack conditions of the beach and only minimal construction proved necessary, unlike at Lae. By the time the last LST was unloaded at 0930, all dumps had been established off the beach and under cover of the jungle canopy.[65]

In the first ten days of operations at Finschhafen, the EBSR had conducted forty assault or resupply missions by water, transporting 700 troops and 500 tons of supplies. Finschhafen would fall on October 1. Fighting would continue in the Finschhafen area for three more weeks as Japanese elements counterattacked and attempted to overrun the EBSR beachhead numerous times. Thus, most of the EBSR's mission was shifted to construction of defenses and fighting as infantry for this period.[66]

While attacks continued near Scarlet Beach, 2nd ESB shifted resources to establishing a base near Langemak Bay, between Lae and Finschhafen, which would later be used as a major resupply base for future operations. Clearance of the Huon Peninsula near Finschhafen would continue into early February, with 532nd EBSR supporting 5th Australian Division operations through coastal resupply clearing from Scarlet Beach all the way north to Sio Bay to secure the Huon Peninsula.[67]

Operational Art in Operation Cartwheel

The Engineer Special Brigade proved to be a critical asset and force multiplier for Southwest Pacific Area forces in Operation Cartwheel. The brigade provided operational

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[65] Office of the Chief Engineer, *Amphibian Engineer Operations*, 122-25; Dod, *The Corps of Engineers: The War Against Japan*, 253.

[66] Office of the Chief Engineer, *Amphibian Engineer Operations*, 129-32; Dod, *The Corps of Engineers: The War Against Japan*, 111-12.

[67] Office of the Chief Engineer, *Amphibian Engineer Operations*, 134-38.

commanders with options to maintain constant pressure on the enemy through sustained ground combat operations. The engineer boat and shore regiments provided the operational commander controlled sustainment through expertise in basing and control of beachhead operations, flexible and increased options to maintain tempo, and prevented culmination through shore-to-shore resupply of ground forces conducting sustained combat operations.

The first element of operational art that use of the EBSRs highlighted is decisive points. The Japanese center of gravity in the SWPA was the ground force holding New Britain, based out of Rabaul. General MacArthur determined an indirect approach to attack the enemy center of gravity. This approach led him through geographic decisive points at Lae and the Huon Peninsula. Control of these geographical areas provided a decided a advantage to SWPA forces once seized, and pushed the Japanese forces onto the defensive. General MacArthur's use of decisive points to link operational objectives in time, space, and purpose set SWPA forces on the road to victory against the Japanese.

The next element of operational art that was enabled was tempo. Conversion of the EBSR from a landing and beachhead force to a forward positioned coastal resupply force was critical in maintaining operational tempo to maintain the initiative against enemy forces in prepared defenses. The Busu River crossing in the operations at Lae highlighted this critical factor. The ability to transport soldiers around an opposed river crossing and envelop a dug-in force was critical in sustaining tempo in a tactical environment. Operationally, the flexibility provided by having the forward-positioned EBSR ready to execute follow-on operations enabled the Finschhafen operation to be executed. This ability to quickly shift positions of combat forces forward of prepared lodgments was decisive in maintaining the initiative for the operational commander and greatly increased options for continued operations.

Finally, the EBSRs greatly extended the operational reach of ground combat forces in New Guinea. Use of EBSRs as resupply units sustaining combat forces outward from a central

lodgment was critical in extending the range of ground combat. The amphibious Navy was not designed for forward sustainment in this manner. The factor that most differentiated Army and Navy amphibious operations was that Army operations were focused toward defeat of an enemy defensive force in sustained ground combat, whereas the Navy was concerned with establishment of forward basing to extend reach across the seas. Operations at Salamaua, Lae, and Finschhafen would likely have culminated well prior to their objectives without herculean construction effort to sustain combat forces overland, which in many cases was near-impossible due to the terrain. The boat regiments greatly extended the culmination point of these ground forces through shore-to-shore sustainment of units on the move.

The utility of the brigades was proven in combat in some of the most trying conditions in the Southwest Pacific. The 2nd Brigade had proven to be an excellent combat multiplier, but these initial operations were small in scale. The ability to establish forward basing, maintain tempo, and extend the operational reach of allied forces was critical in gaining the initiative against Japanese ground forces in New Guinea in 1943. The brigade, however, was designed to support sustained division operations in combat, but to this point had only executed as piecemealed units hastily put together in support of dispersed brigades. That would quickly change with execution of operations in Hollandia.

Case Study 2 - Hollandia

By early 1944, Rabaul's Japanese defenders had increased from 90,000 to 100,000 ground troops in preparation for an attack that would never come.[68] This would prove too large of a force and require too much time for a deliberate operation. Instead, Rabaul would remain isolated for the remainder of the war. The Joint Chiefs of Staff (JCS) ordered a change in strategy

[68] Ian Toll, *The Conquering Tide: War in the Pacific Islands, 1942-1944* (New York: W.W. Norton and Company, 2015), 240.

in March 1944 from protection of lines of communication (LOCs) and seizure of Rabaul to offensive operations to retake the Philippines.[69]

The original Elkton Plan called for a deliberate offensive to seize Madang, Hansa Bay, Wewak, and Hollandia in that order. The JCS, with the prodding of General MacArthur, decided to bypass Madang, Hansa Bay, and Wewak and would jump allied forces 400 miles and many months forward, isolating as many as 70,000 Japanese troops, mostly preparing defenses for an expected invasion of Wewak and Hansa Bay (see Map 5).[70] Additionally, the JCS decided that thrusts toward Japan would continue through both the Central Pacific and Southwest Pacific theaters, a decision that would disperse the limited resources available throughout the theater but would prevent Japanese forces from concentrating at any one area.[71] After early success in the Central Pacific area, the Joint Chiefs of Staff issued new guidance in March 1944 for Southwest Pacific Area forces to bypass Rabaul and concentrate forces to take Hollandia to use as a major air base for future attacks toward the Phillipines with D Day set for April 15, 1944 and future landing in the Philippines set for November 15, 1944.[72]

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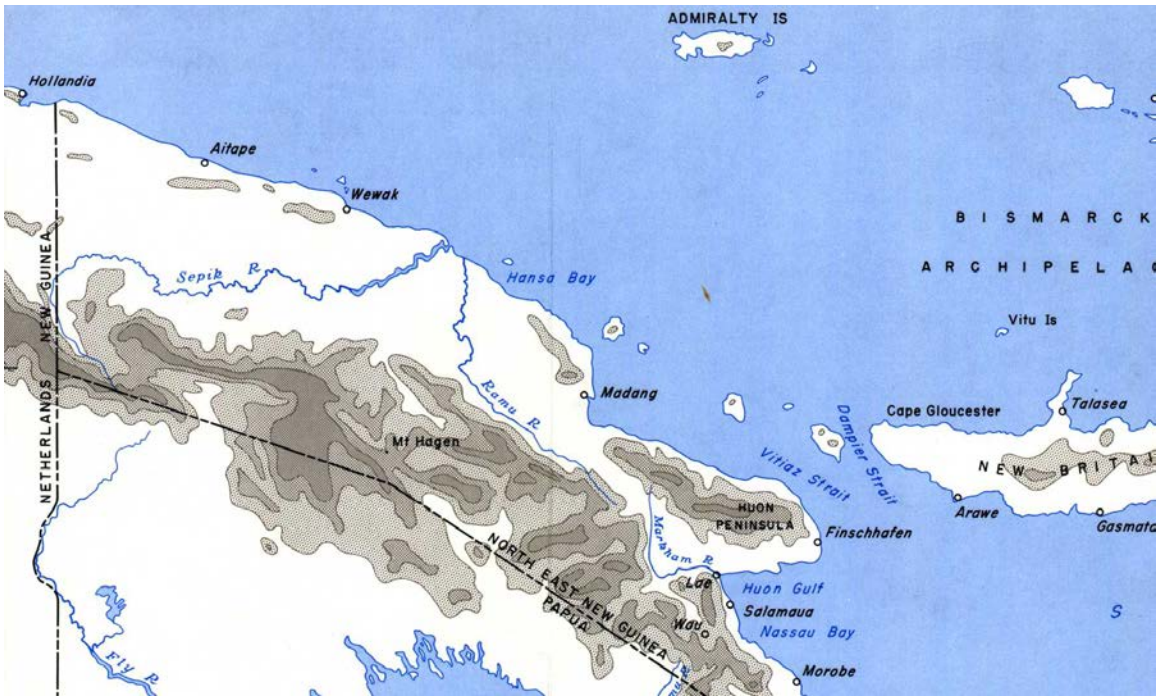
[69] Robert Smith, *The Approach to the Philippines, US Army in World War II: The War in the Pacific* (Washington, DC: Center of Military History, 2005), 1.

[70] Office of the Chief Engineer, *Amphibian Engineer Operations,* 250-251.

[71] Smith, *The Approach to the Philippines,* 5.

[72] Smith, *The Approach to the Philippines*, 11-12; Barbey, *MacArthur's Amphibious Navy*, 151, 159; Dod, *The Corps of Engineers: The War Against Japan*, 527; Eichelberger, *Our Jungle Road to Tokyo*, 101.



Map 5. John Miller Jr., *Cartwheel: The Reduction of Rabaul, US Army in World War II: The War in the Pacific* (Washington, DC: Center of Military History, 2006), 205.

Hollandia was believed to provide excellent anchorages for the largest cargo vessels in the fleet, the ability to expand airdromes to support a major air base, and land available to transform into a primary base of supply.[73] It was immensely important to both the allies and Japan, and Japanese forces had spent years building Hollandia into a base of supply supporting numerous corps throughout New Guinea. Lieutenant General Walter Krueger stated that intelligence estimated that the bulk of Japanese air capability on New Guinea was based at Hollandia.[74] Loss of this critical base for the Japanese was thought to be irreparable, especially for the masses of troops forward in the Wewak and Hansa Bay areas.[75]

[73] Smith, *The Approach to the Philippines,* 13.

[74] Krueger, Walter, *From Down Under to Nippon: The Story of the Sixth Army in World War* (Washington, DC: Combat Forces Press, 1953), 58.

[75] Office of the Chief Engineer, *Engineers in Theater Operations,* 156.

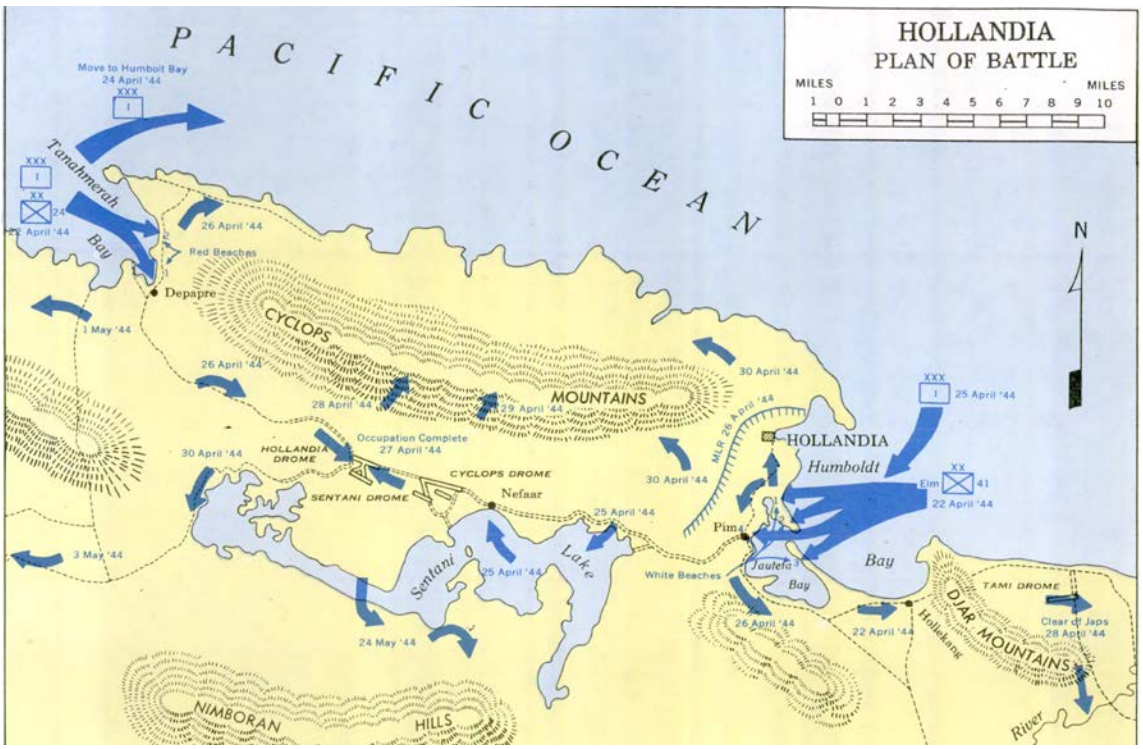
The expected size of the enemy force meant a drastically larger force would be required to take Hollandia than in previous operations. Bypassing previously identified key points and jumping hundreds of miles from current bases meant that carrier air support from the Pacific Fleet would be used in the Southwest Pacific Area.[76] Success of the operation depended on surprise and deception to force the enemy commander to believe that the next operation would be at Wewak and Hansa Bay instead of at Hollandia.[77]

The Hollandia terrain on the coast of Northwest New Guinea presented unique challenges. The centrally located airfields lie about ten miles inland on the other side of the Cyclops Mountain Range, a roughly 7,000-foot-high ridgeline running east to west. The Cyclops Range separated the two bays that would be used for the amphibious invasion, Humboldt Bay and Tanahmerah Bay, which lie about twenty-five miles apart and eighteen and fourteen miles from the airfields respectively (see Map 6).[78]

[76] Smith, *The Approach to the Philippines*, 13-14; MacArthur, *Reminiscences*, 189; Barbey, *MacArthur's Amphibious Navy*, 158.

[77] Krueger, *From Down Under to Nippon*, 59.

[78] Smith, *The Approach to the Philippines*, 16; Dod, *The Corps of Engineers: The War Against Japan*, 527; Office of the Chief Engineer, *Engineers in Theater Operations*, 157; Office of the Chief Engineer, *Amphibian Engineer Operations*, 252.



Map 6. Office of the Chief Engineer, General Headquarters Army Forces, Pacific, *Engineers of the Southwest Pacific 1941-1945 Volume I: Engineers in Theater Operations* (Washington, DC: United States Government Printing Office, 1947), 159.

Carrier support, though, would prove lacking in planning for Hollandia due to the dual campaigns ongoing in the Pacific. Admiral Nimitz could only provide carriers for a limited time that would make holding Hollandia against an expected counterattack nearly untenable. The decision was made to secure a land-based site east of Hollandia for fighter aircraft usage, eventually settling on Aitape, 120 miles east of Hollandia. D Day would eventually change to April 22 due to issues obtaining logistical support, air coverage and carrier support for simultaneous assaults to seize Hollandia and Aitape.[79]

Overall command of the operation would be given to I Corps and Lieutenant General Robert Eichelberger who would assume command of Reckless Task Force. General Eichelberger was tasked with an offensive to seize Hollandia with two division landings on multiple beaches

[79] Robert Smith, *The Approach to the Philippines, US Army in World War II: The War in the Pacific* (Washington, DC: Center of Military History, 2005), 21-23.

converging on airdrome objectives in the vicinity of Sentani Lake.[80] Reckless Task Force constituted the largest joint force put together to this point in the Southwest Pacific Area.[81] Persecution Task Force, the 163rd Infantry Regiment from the 41st Division, would seize Aitape with the objective of seizing Tadji airdrome and screening the eastern flank of Reckless Task Force, effectively cutting off attempted reinforcement or breakout from Wewak (see Figure 2).[82] On March 15, the 532nd and 542nd EBSRs of 2nd ESB were assigned to I Corps for the Hollandia operation. 532nd would land 41st Division at Humboldt Bay to the east of the Cyclops Range and 542nd would land 24th Division at Tanahmerah Bay to the west. The 592nd EBSR from 3rd ESB would land the 163rd Infantry Regiment at Aitape.[83] The plan called for the landing of 80,000 men, 50,000 tons of supplies, 3,000 vehicles using 217 naval vessels and 232 Army boats in simultaneous landings at three different locations, a dramatic increase from the initial landings at Nassau Bay.[84] The pattern established in 1943 was well-rehearsed and prepared for 1944: "air bombardment, naval bombardment, landing of assault forces, defeat of enemy troops in the area, and construction of airfields and base facilities."[85]

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[80] Office of the Chief Engineer, General Headquarters Army Forces, Pacific, *Engineers of the Southwest Pacific 1941-1945 Volume IV: Amphibian Engineer Operations* (Washington, DC: United States Government Printing Office, 1959), 253; Robert Eichelberger, *Our Jungle Road to Tokyo* (New York: The Viking Press, 1950), 102.

[81] Karl Dod, *The Corps of Engineers: The War Against Japan, US Army in WWII, the Technical Services* (Washington, DC: Center of Military History, 1987), 529.

[82] Office of the Chief Engineer, *Amphibian Engineer Operations*, 253.

[83] Office of the Chief Engineer, *Amphibian Engineer Operations*, 256; Heavey, *Down Ramp*, 122. 3rd ESB arrived in theater in November and December 1943, and would support small operations in SWPA with company+ sized elements. It would take until April 1944 to constitute a full regiment to support SWPA operations.

[84] Barbey, *MacArthur's Amphibious Navy*, 162.

[85] Dod, *The Corps of Engineers: The War Against Japan*, 521.

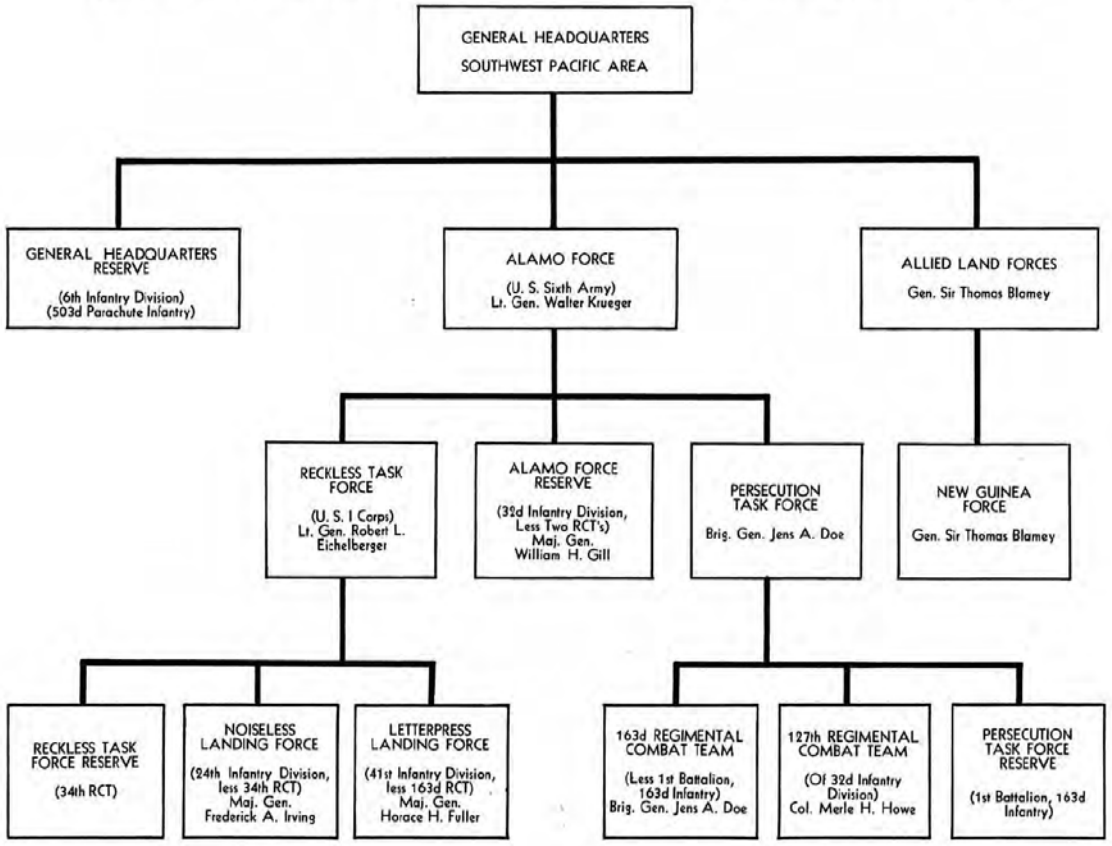

Figure 2. Robert Smith, *The Approach to the Philippines, US Army in World War II: The War in the Pacific* (Washington, DC: Center of Military History, 2005), 17.

All task forces were to be loaded on ships and prepared to move for rendezvous at sea set for 0700 on D-2 (April 20) north of Manus island in the Admiralties, with movements of up to 1,000 miles to reach the rendezvous requiring stowage of the smaller ESB boats onto Navy ships for the movement.[86] The fleet would take a circuitous route northward to deceive Japanese spotters.[87] The massive convoy traveled together to a point about sixty miles offshore and

[86] Office of the Chief Engineer, *Amphibian Engineer Operations*, 262; Heavey, *Down Ramp*, 114; Dod, *The Corps of Engineers: The War Against Japan*, 530.

[87] Barbey, *MacArthur's Amphibious Navy*, 167.

halfway between Hollandia and Aitape at 1900 on D-1 (April 21) and then separated to head to final objective areas for a simultaneous attack at 0700 on April 22.[88]

The key to the operations would be deception, as at each location the amphibious assaults completely surprised the defending Japanese forces. Intensive early bombings of Wewak and Hansa Bay and the circuitous northern route and other deception operations would prove extremely valuable for the amphibious landings to come.[89]

Tanahmerah Bay: April 1944

The Tanahmerah plan called for landings at two beaches with the main effort from Reckless Task Force as it was presumed to provide the most suitable beaches for landing and support and the best routes to the final objectives. Red Beach 2 was the primary landing site as Red Beach 1 was identified correctly as being coral infested, thus reducing the possibility of landing larger vessels. The 542nd's LVTs would be used at Red Beach 1 and would be critical in seizing a road transiting from Red Beach 1 to Sentani Lake. The Tanahmerah Bay boat group consisted of eighty-two LCVPs, fifty-seven LCMs, three LCSs, a support battery of two rocket DUKWs, one flak LCM, one combat LVT, and sixteen troop-carrying LVTs.[90]

The 24th Infantry Division as Noiseless landing force at Tanahmerah Bay arrived on time at 0500 at the staging point for the assault, approximately 10,000 yards off shore. Landing craft of the EBSR were immediately dropped in the water and prepared for boarding. Naval bombardment opened on Red Beach 2 at 0600 and slow moving LVTs started moving toward Red Beach 1. Wave 1 LCVPs of Red Beach 2 began moving shortly thereafter. The wave schedule was thrown

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[88] Office of the Chief Engineer, *Amphibian Engineer Operations*, 265-66; Heavey, *Down Ramp,* 115.

[89] MacArthur, *Reminiscences,* 190.

[90] Office of the Chief Engineer, *Amphibian Engineer Operations,* 258-59; Office of the Chief Engineer, *Engineers in Theater Operations,* 163.

off by misplacement of control ships that misjudged the distance from shore by almost a mile and by difficulty in dropping EBSR boats from LSDs in turbulent seas.[91]

Wave 1 at Red Beach 2 landed at 0708, eight minutes past H hour, without a Japanese soldier in sight. Troops of successive waves landed without issue but it was soon discovered that the area beyond the beach was a massive swamp and the expected road network identified by aerial reconnaissance was actually a river. The swamp was quickly mapped and identified as being over 300 meters in linear depth and bound on all sides by difficult terrain. Being unable to expeditiously build exit roads or dump sites, congestion on the beach started immediately.[92] Once the division commander arrived on shore, he determined that the expected road network linking Red Beach 1 and Red Beach 2 did not exist and initiated the first movement of infantrymen from Red Beach 2 to Red Beach 1 by shore to shore movement ferried by the 542nd EBSR. Cargo ships were procured to transport equipment due to a lack of available naval supply vessels and had to be unloaded painstakingly piece by piece from the deck of the ships to an EBSR LCM and dumped on shore. Despite the difficulties involved, three of these ships with 1,800 tons of supplies were unloaded in four hours. All waves and ships had completed movement and download of supplies by 1900 on D Day, but the pileup of equipment on Red Beach 2 was tremendous, requiring the 542nd to work all night under white light to construct roads and dumps through the swamp.[93]

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[91] Office of the Chief Engineer, *Amphibian Engineer Operations*, 266-67; Barbey, *MacArthur's Amphibious Navy,* 170; Eichelberger, *Our Jungle Road to Tokyo,* 106.

[92] Office of the Chief Engineer, *Amphibian Engineer Operations*, 268-72; Eichelberger, *Our Jungle Road to Tokyo*, 108; Heavey, *Down Ramp,* 116; Dod, *The Corps of Engineers: The War Against Japan,* 530.

[93] Office of the Chief Engineer, *Amphibian Engineer Operations*, 273-74; Heavey, *Down Ramp*, 116.

At Red Beach 1, first wave elements landed successfully at 0720. Combat LVTs and support battery craft fired in support of the landing due to lack of naval gun support.[94] Just as at Red Beach 2, the assault was unopposed. Initial recon of Red Beach 1 determined that LCMs could beach, but only at high tide and only two at a time because it was so narrow. LSTs would not be able to approach due to the coral throughout the bay. Infantrymen from 3d Battalion 21st Infantry landed at Red Beach 1, immediately established a defensive perimeter and had reconnoitered trails eight miles inland unopposed by midafternoon. This unexpected success, closing within three miles of Sentani Lake, required immediate shifting of resources from Red Beach 2.[95]

On D+1 at 0700 seven more LSTs arrived to unload equipment. Enough roads were constructed and space was created to clear some of the beach and allow for unloading of equipment from the LSTs. However, it was quickly decided to start transferring supplies from Red Beach 2 to Red Beach 1. By the end of D+1, it was clear that Red Beach 2 provided excellent anchorages, approaches, and beach length to unload but had no suitable way to get equipment off the beach, while Red Beach 1 provided excellent space for exit roads, dump sites and supply points but without suitable anchorages. For these reasons, Lieutenant General Eichelberger was required to change the main effort from forces at Tanahmerah Bay to forces at Humboldt Bay due to the inability to support additional supplies. All troops and supplies planned for arrival after D+2 were shifted to delivery at Humboldt Bay. Red Beach 2 would become a depot for the main supply point at Red Beach 1. From D+3 on, the EBSR at Tanahmerah Bay concentrated on clearing Red Beach 2 and shifting supplies to either Red Beach 1 to support

[94] Boose, *Over the Beach*, 48. ESB Support Battery was developed to cover "the 1,000 yard or 4 minute gap" that was created when naval gunfire was halted to prevent friendly fire incidents. Rockets, flak guns, and large caliber machine guns were fitted onto DUKWs, LVTs, LCVPs and LCMs to make up the battery.

[95] Office of the Chief Engineer, *Amphibian Engineer Operations*, 276-77.

elements already landed at Depapre and making their way inland or moving supplies to the now main effort at Humboldt Bay. A regular shuttle was established between Humboldt and Tanahmerah by April 27.[96]

Engineer reconnaissance craft, matched with infantry elements conducted multiple reconnaissance missions along the coast west of Tanahmerah Bay, resulting in numerous successful small-unit raids spoiling Japanese counterattacks before they could occur. The 542nd employed 158 boats (104 LCVP and fifty-four LCM) in April to conduct the transport of 42,000 troops and carry 17,000 tons of supplies plus an additional 10,000 tons unloaded from Navy and Civilian ships in support of operations at Tanahmerah Bay.[97]

Humboldt Bay: April 1944

Humboldt Bay engineer boat group of the 532nd consisted of twenty-five LCVPs, forty LCMs, one LCS, one J-Boat, two LCP(L)s, and a support battery of two rocket LCVPs, two combat LVTs (Buffalos) and twenty-seven troop-carrying LVTs. The large number of LVTs were required due to expected coral obstacles in Jautefa Bay. Four simultaneous landings were planned at White Beaches 1, 2, 3, and 4 with the same H hour at 0700 on April 22. White Beaches 1, 2, and 3 were ocean facing and provided good approaches and beaches, but White Beach 4 was within Jautefa Bay with much coral expected, so all LVTs were directed there.[98] The main landing was to occur at White Beach 1 with White Beaches 2 and 3 serving to secure the flanks of the main supply area.[99]

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[96] Office of the Chief Engineer, *Amphibian Engineer Operations,* 275-78; Dod, *The Corps of Engineers: The War Against Japan,* 531; Barbey, *MacArthur's Amphibious Navy,* 176.

[97] Office of the Chief Engineer, *Amphibian Engineer Operations,* 280-83.

[98] Ibid., 258.

[99] Ibid., 285.

All elements reached the final staging area 10,000 yards offshore by 0500. LCMs and LCVPs of 532nd EBSR were dropped into the water and loaded. At 0600 three light cruisers and six destroyers opened fire on the White Beaches for a forty-five-minute bombardment.[100] All assault elements of wave 1 across White Beaches 1, 2, and 3 landed near-simultaneously at 0700, minus one LCVP at White Beach 2. Japanese opposition was minimal and limited to sniper fire. Japanese supplies and equipment were located in dumps dispersed at each of the landing beaches but this only caused problems at White Beach 1 as dumps there occupied the predominance of available space and were on fire due to the naval and air bombardment.[101]

One flak LCM led eighteen LVTs and two rocket LCVPs toward White Beach 4 against token Japanese resistance that was quickly silenced by direct fire from the LCM. The landing occurred unopposed and the assault force quickly moved to control the road inland between the towns of Hollandia and Pim, situated very close to and on a direct route to Sentani Lake. Soon after White Beach 4 was secured, overland contact was established with White Beach 1, but it was determined that no heavy vehicles would be able to traffic the path without significant road construction effort. All movement and resupply would have to occur shore-to-shore. Landing craft of the EBSR were employed throughout Jautefa Bay to clear the area of Japanese defenders and secure the route from White Beach 1 to White Beach 4, as well as to clear a number of small islands that held Japanese forces just off of White Beach 1.[102]

The plan was to unload 17,000 tons of bulk supplies on D Day at White Beach 1. The swamp at the back of the beach and still-burning Japanese supply dumps meant a change to transporting offloaded supplies from White Beach 1 toward White Beach 4 onto better terrain via

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[100] Ibid., 284; Barbey, *MacArthur's Amphibious Navy*, 176.

[101] Office of the Chief Engineer, *Amphibian Engineer Operations*, 286; Office of the Chief Engineer, *Engineers in Theater Operations*, 163.

[102] Office of the Chief Engineer, *Amphibian Engineer Operations*, 287-88; Heavey, *Down Ramp*, 116.

the Pim to Hollandia road.[103] As at Tahnamerah Bay, efficiency in unloading and difficult terrain meant supplies piled up across the entire breadth of White Beach 1. The EBSR worked diligently to complete exit roads, but it would not take place on D Day. The result was a pileup of over 5,000 tons of supplies on the main entry beach. Unloading operations began promptly at 0830 on D+1 (April 23) with the arrival of five more LSTs. The beach congestion had not improved overnight and the newly arrived equipment only added to the problem. A decision was made on D+1 that only White Beaches 1 and 4 were suitable for further development. LCVPs and LCMs were put to work transporting troops from White 1 to White 4, though the capacity of White 4 was limited to two LCMs at a time. Other EBSR reconnaissance craft continued searching Jautefa Bay on D+1, resulting in the location of over eighty-six Japanese landing craft and numerous dumps scattered throughout the islands, inlets, and beaches of the bay.[104] These captures were yet more evidence of successful deception operations at Hollandia.

Congestion on White 1 resulted in catastrophe at the end of D+1. A Japanese bomber slipped through the carrier screen and hit a former Japanese ammo dump which quickly spread to a Japanese fuel dump. These initial explosions spread rapidly among the chaos and congestion of the beach, especially among hastily emplaced ammo and fuel dumps that had not been properly dispersed. Fires burned for two more days and destroyed thousands of tons of equipment and resulted in the death of twenty-four men. The EBSR was critical in salvaging hundreds of tons of supplies and saving numerous lives, rescuing hundreds of soldiers trapped by fires and explosions from the beach.[105]

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[103] Office of the Chief Engineer, *Amphibian Engineer Operations*, 288.

[104] Ibid., 293-94; Office of the Chief Engineer, *Engineers in Theater Operations,* 163.

[105] Office of the Chief Engineer, *Amphibian Engineer Operations*, 296-99; Office of the Chief Engineer, *Engineers in Theater Operations*, 163; Barbey, *MacArthur's Amphibious Navy,* 176; Dod, *The Corps of Engineers: The War Against Japan,* 530; Eichelberger, *Our Jungle Road to Tokyo,* 110; Heavey, *Down Ramp,* 116.

While fires burned on White Beach 1, twelve more LSTs arrived to unload on D+2, including five LSTs rerouted from Tahnamerah Bay due to offloading issues at Red Beach 2. The decision was made to use White Beach 3 as a dump point and to have the EBSR transport all personnel and equipment from White 3 to White 4.[106]

The infantry advance inland of White Beach 4 continued toward Sentani Lake, but quickly became mired down due to poor road conditions. The EBSR shifted LVTs and DUKWs to supporting the offensive north that proved critical in maintaining tempo. Roads leading directly to the three airdrome objectives were defended by Japanese and the terrain impeded maneuver. The LVTs and DUKWs were employed to flank the defenders using an overwater route across Sentani Lake. The defenders were forced to abandon their positions and fall back into the surrounding hills.[107]

On D+3, LSTs were brought in for offload at White Beach 3. The EBSR was employed in offloading all ships, building suitable ramps to the ships, and transshipping offloaded supplies and personnel to White Beach 4. The lack of available beach at White 4 to drop supplies coming from White 3 would continue to cause problems for the next five days. The predominance of the remaining effort at Humboldt Bay would be spent offloading supplies at White Beach 3, transshipping those supplies to White Beach 4, and preparing exit roads from each beach to combat units in the interior.[108]

On April 26 (D+4), Sentani Lake was again utilized by DUKWs and LVTs to bypass defensive positions and Sentani Drome, Cyclops Drome, and Hollandia Drome fell in quick succession. By 1645, all objectives had been secured and linkup with 24th Division elements

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[106] Office of the Chief Engineer, *Amphibian Engineer Operations*, 299.

[107] Ibid., 302-03; Heavey, *Down Ramp*, 117.

[108] Office of the Chief Engineer, *Amphibian Engineer Operations*, 303-04.

from Depapre had taken place.[109] Due to continued difficulties in resupplying interior units, EBSR DUKWs and LVTs established supply points around Sentani Lake, using the water route as the primary supply route. Resupply operations of the corps through Humboldt Bay would settle into a rotational four-day operation, making beachhead operations routine at Hollandia.[110]

From D Day to D+8, thirty-five LCVPs and fifty-three LCMs had transported 14,000 troops and 12,000 tons of supplies and offloaded an additional 17,500 tons of supplies at the White Beaches. The difficult, swampy terrain and lack of suitable anchorage would prove too much to overcome to establish a long-term supply base at Hollandia, but it would remain as an interim forward staging base for future operations. Planned construction would be reduced from six to three airfields, from four million to three million square feet of covered storage and the plan to create a base of supply for 200,000 men forward of Hollandia was reduced to 140,000 men. In the five months Hollandia operations continued, the 532nd EBSR was employed in the transport of 283,000 troops and 185,000 tons of supplies.[111]

Aitape: April 1944

Persecution Task Force would be a direct reporting unit to Lieutenant General Walter Krueger and Alamo Task Force Headquarters, instead of reporting through I Corps, its parent headquarters.[112] The main element making up Persecution Task Force was 163rd Infantry Regiment from 41st Division and was supported by 593rd EBSR from 3rd ESB. There was an extremely large engineer force (2,380 of about 8,600 total) for this operation due to the expected construction effort. The 593rd EBSR was reinforced for the assault phase by thirty-six navy

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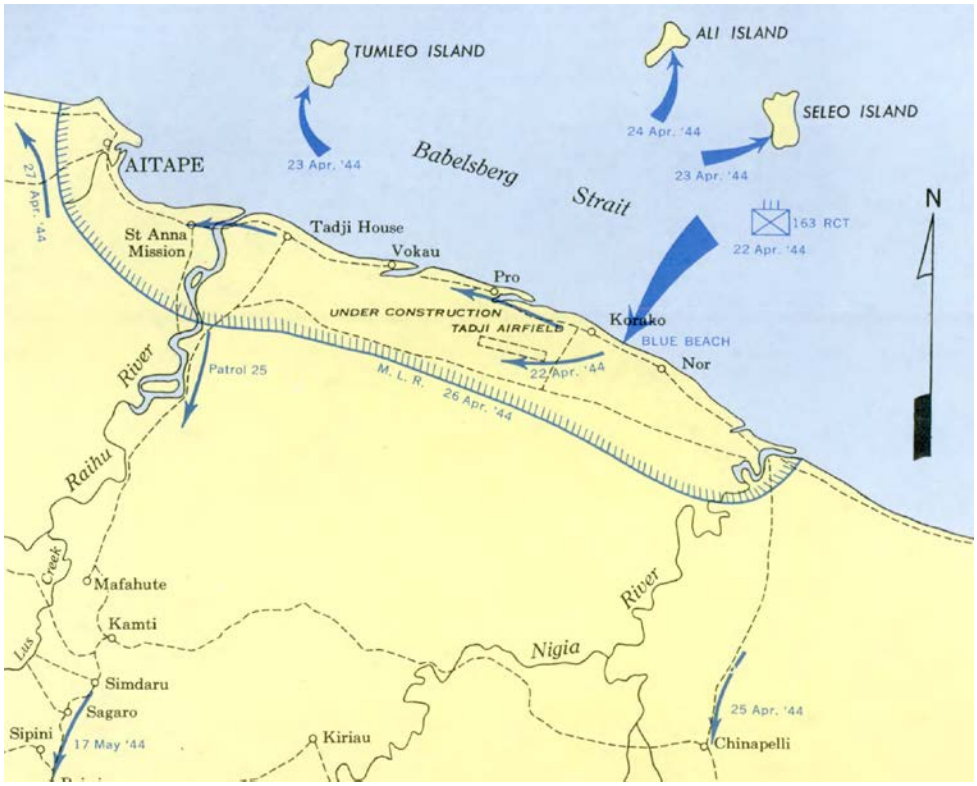
[109] Ibid., 304; Eichelberger, *Our Jungle Road to Tokyo*, 110.

[110] Office of the Chief Engineer, *Amphibian Engineer Operations*, 307-08.

[111] Ibid., 309-12; Dod, *The Corps of Engineers: The War Against Japan*, 534; Office of the Chief Engineer, *Engineers in Theater Operations*, 157-58.

[112] As mentioned previously, General MacArthur had a penchant for creating task forces to get around the requirement to have an Australian general officer as land forces commander.

LCP(R)s. The boat group in total included ten LCVPs, five LCMs, thirteen LVTs, plus thirteen DUKWs to land at Blue Beach, the only beach supporting operations at Aitape (see Map 7).[113]



Map 7. Office of the Chief Engineer, General Headquarters Army Forces, Pacific, *Engineers of the Southwest Pacific 1941-1945 Volume I: Engineers in Theater Operations* (Washington, DC: United States Government Printing Office, 1947), 165.

Aitape elements in Persecution Task Force reached their transportation point at 0500 on D Day (April 22) and immediately got to work unloading boats, personnel, and equipment for initial assault at Blue Beach. Destroyers opened fire on the beach at 0600 and the first wave hit the beach virtually unopposed at 0645. Blue Beach proved to be decidedly better than the White or Red beaches. Supply LSTs approached to within forty feet of shore, the beach was relatively hard packed, and there were no swamps in the vicinity of the landing. A hard packed, wooded

[113] Office of the Chief Engineer, *Amphibian Engineer Operations*, 259-62.

area to the rear of the beach provided excellent concealment and space for supply dumps.[114] Unloading of cargo ships proved to be extremely difficult with the number of assigned boats and personnel on hand. The LCVPs proved almost useless as the unprotected surf at Blue Beach would beach the craft as soon as they attempted landing. The DUKWs, however, would prove to be the most useful vehicles in unloading operations.[115]

Patrols of the 163rd Infantry rapidly pushed inland following the initial assault closing on the Tadji airstrips by noon and securing them by 1400 on D Day. The EBSR construction effort inland intensified building exit roads to move supplies and equipment to Tadji airstrip. Unloading of supplies continued on D+1 with the arrival of six LSTs and an additional cargo ship. The mass amount of supplies coming in meant that the dumps were initially filled with unsegregated classes of supplies, requiring additional work later. But, having the ships and beaches cleared first was the priority. Segregating would begin on D+2 with a pause in the arrival of LSTs.[116]

D+3 found the LCMs of the 593rd employed transporting combat elements up and down the coast within fifty miles of Blue Beach conducting search and destroy missions of Japanese forces. The LVTs were also employed as ammo transports to short-cut routes through the swamps to troops inland and prevent road congestion.[117] These limited tactical operations eliminated

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[114] Office of the Chief Engineer, *Amphibian Engineer Operations*, 314-15; Dod, *The Corps of Engineers: The War Against Japan*, 533; Heavey, *Down Ramp*, 116; Office of the Chief Engineer, *Engineers in Theater Operations*, 171.

[115] Office of the Chief Engineer, *Amphibian Engineer Operations*, 317; Engineer Amphibian Command, *Engineer Amphibian Command Tentative Training Guide No. 7, Engineer Amphibian Troops: The Organization of the Far Shore* (Camp Edwards, MA, 1943), 101. The DUKW was designed specifically to unload supplies from ship to shore and provided the most practical way to complete ship-to-shore unloading. Using an LCVP or LCM would have required an additional stop to unload supplies to the beach before moving inland, whereas the DUKW (and LVT) could drive direct from ship to dump site.

[116] Office of the Chief Engineer, *Amphibian Engineer Operations*, 320-21.

[117] Ibid., 322; Dod, *The Corps of Engineers: The War Against Japan*, 533.

enemy forces in the friendly rear area and freed infantry forces to posture forward at the Driniumor River to defend against a Japanese counterattack.

Late April and May found the EBSR in relative routine. Unloading supplies, resupplying troops in the interior, and on the coasts and preparing for future operations. In June, Japanese documents were captured showing a plan to penetrate the Driniumor River line with 20,000 troops and an 11,000-man reserve to breakout the 70,000 men cutoff in the Wewak area. The now-533rd EBSR supported Driniumor operations in July in numerous resupply, rescue, and amphibious assaults.[118] By mid-July the predominance of fighting had moved inland and the EBSR was employed primarily in maintaining and securing Blue Beach and supporting the flow of supplies inland. By early August, the Japanese forces had been defeated.[119] In its first five months at Aitape, the combined 533rd and 593rd EBSRs offloaded over 180,000 tons of supplies and equipment in support of continuous operations. That number would grow to almost 240,000 tons by December.[120]

Operational Art at Hollandia-Aitape

The Engineer Special Brigades proved their worth once again in operations at Hollandia and Aitape. For the first time in combat, full brigades were ready and available for combat and Army watercraft conducted the mass landing of a corps. The ESBs greatly increased the flexibility of operational and strategic options for General MacArthur and presented multiple dilemmas to the Japanese commanders that could not be overcome. Use of the ESBs to increase

[118] Office of the Chief Engineer, *Amphibian Engineer Operations*, 325. The 533rd was tasked to continue north for additional operations and only provide the 593rd with resupply and fresh equipment. However, there was a mix-up upon arrival at Aitape and the 533rd assumed the 593rd's mission in total.

[119] Ibid., 325-28; Office of the Chief Engineer, *Engineers in Theater Operations*, 172.

[120] Office of the Chief Engineer, *Amphibian Engineer Operations*, 325-330.

operational reach, strategic and operational tempo, and balancing of risk and opportunity resulted in decisive US victory in the SWPA to serve as a springboard to the Philippines.

As during Operation Postern, the ESB increased operational reach of SWPA forces in New Guinea. The 532nd and 542nd operating at Hollandia provided flexibility to I Corps that would not have been possible had the operation only been conducted by Navy amphibious units. Beach difficulties in Tanahmerah Bay would prove to be only a temporary setback. The ability to reposition thousands of tons of equipment and consolidate all resupply to one beach was critical in sustaining forces in Hollandia. Tactically, at both Hollandia and Aitape, combat forces were sustained through great effort of EBSR personnel serving as primary resupply over water and through swamps that would have caused culmination had those forces not been available.

Tempo proved decisive for the operations at Hollandia. The ability for SWPA forces to maintain constant pressure across the theater proved too much for Japanese commanders to overcome. Having the ESBs available and not relying completely on Navy sustainment proved crucial. Without the ESBs, the concept of sustaining a corps at three separate landing locations for a period of over five months in terrain that would not support overland sustainment would have been impossible. Possessing organic amphibious engineers allowed for continued operations along multiple lines of operation within the SWPA to maintain operational tempo. This availability allowed for other resources to be continuously diverted to the Central Pacific to maintain strategic tempo, as well. Hollandia was planned while operations in the Admiralty Islands were executed, and the follow-on operations at Wakde-Biak began while Hollandia was ongoing.[121] US forces would seize the initiative from the Japanese during 1944 and would stay on the strategic and operational offensive for the remainder of the war.

[121] Krueger, *From Down Under to Nippon,* 75.

The final element of operational art that General MacArthur capitalized on was risk. There was a distinct risk in approving operations at Hollandia to go forward in the first place. Bounding US forces hundreds of miles forward without total sea control could have resulted in isolation of a US corps behind enemy lines. Balanced with the opportunity of isolating as many as 70,000 Japanese forces and seizing the primary Japanese resupply port on New Guinea. The ESBs proved decisive in seizing this opportunity and defeating a sizeable Japanese army, minimizing the risk to mission and making General MacArthur's decision easier. This strategic maneuver would serve as a blueprint for General MacArthur for years to come, all because of the opportunity created by the flexibility of the ESBs. Success at Hollandia-Aitape was due to tactical and strategic surprise, enabled through the balanced approach to risk mitigation. The enemy did not detect the force moving to Hollandia and was concentrated on Wewak and Hansa Bay throughout the operation.[122]

The amphibian engineers provided a robust capability to overcome the risk of isolation, extend operational reach, and maintain tempo to seize the initiative from Japanese forces on New Guinea. Engineer special brigades were critical in turning the tide against Japanese forces in the Southwest Pacific. The specialization and expertise of Army amphibians expanded the inventory of options for General MacArthur. The Army would be well served in regaining this capability for the future force, but there are challenges that have to be overcome.

The Future of the Amphibious Force

> In one sense… every operation has its special requirements… any standard unit should expect that, at some time or other, it may be called upon to engage in them.
>
> — Field Marshall William Slim, *Defeat into Victory*

Engineer Special Brigades will not return to the Army inventory, nor will specialized amphibious forces capable of controlling all aspects of amphibious landings. The Army is not the

[122] Krueger, *From Down Under to Nippon,* 74.

Marine Corps. The capabilities the amphibious brigades provided and the flexible options created for commanders should, however, be replicated. The question is how to accomplish it. The Army must be able to operate in multiple domains as part of the greater multi-domain battle concept. Projecting land power from the sea is a critical capability that the Army has lost and must regain to prepare for future war.

In great power conflict, land power has primacy. Land forces are the only ones that can conquer and control land which "is the supreme political objective in a world of territorial states."[123] In limited objective conflicts, the threat of force projection onto land is required to break the will of your adversary. The stopping power of water, however, is critical in understanding the use of land forces. Maritime forces have capabilities in controlling seas, but projecting force from the sea to the shore is much more difficult. Naval theorist Sir Julian Corbett was careful to point out that navies are at a distinct disadvantage when attempting to deliver land forces onto a hostile shore.[124] The current anti-access, area denial (A2AD) capabilities of potential American adversaries are important in determining the ways and means to overcoming this difficulty.

Current Joint Force doctrine proclaims multi-domain battle as the future of armed conflict. Through multi-domain battle, a Joint Force attacks an adversary across all domains simultaneously or sequentially to achieve strategic objectives. It is critical for Army forces to be able to execute operations in depth across multiple domains as part of the Joint Force.[125] Joint combined arms maneuver across all domains increases lethality through multi-domain

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[123] John Mearsheimer, *The Tragedy of Great Power Politics* (New York: W.W. Norton & Company, 2001), 83.

[124] Julian Corbett, *Some Principles of Maritime Strategy* (Annapolis, MD: Naval Institute Press, 1988), 114.

[125] US Army Training and Doctrine Command (TRADOC) Pamphlet 525-3-1, *The US Army Operating Concept: Win in a Complex World, 2020-2040*, 31 October 2014, 21.

simultaneous action across time and space.[126] Operations at Lae demonstrated succinctly how simultaneous air, land, and sea attacks against Japanese forces presented the enemy commander with multiple dilemmas that he was not able to overcome. Current doctrine similarly trumpets this synchronicity of joint, multi-domain concepts.

Near-peer competitors, however, have significant A2AD capabilities, and the Army must be able to overcome these enemy denial systems as a part of the Joint Force. The Army Capabilities Integration Center (ARCIC) argues in its multi-domain battle concept that the Joint Force does not have to overcome the enemy in all domains across all areas, but must "create temporary windows of superiority across multiple domains and throughout the depth of the battlefield to seize, retain, and exploit the initiative and achieve military objectives."[127] These temporary windows of opportunity are created by exploiting enemy domain weaknesses in breadth or by attacking in strength at discrete locations.

The primary means to overcoming A2AD systems is by attacking the defending force's strategy where it is weakest in time and space across domains. For this concept to succeed, cross-domain synergy is critical in joint forcible entry operations. This requires integration across the Joint Force as opposed to providing "merely additive" capabilities.[128] Synergy is achieved through repetition in training and standardized practices across the joint force that creates working relationships and an understanding of each services' abilities. The development of

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[126] Ibid., 23.

[127] US Army Capabilities Integration Center (ARCIC), *Multi-Domain Battle: Combined Arms for the 21st Century*, accessed February 18, 2017, http://www.arcic.army.mil/App_Documents/Multi_Domain_Battle.pdf., 1.

[128] U.S. Joint Staff, *Joint Operational Access Concept*, version 1.0, 17 January 2012, 14; Joint Publication (JP) 3-18, *Joint Forcible Entry Operations*, 27 November 2012, I-1-7. "Joint forcible entry operations seize and hold lodgments against armed opposition. A lodgment is a designated area in a hostile or potentially hostile area that, when seized and held, makes the continuous landing of troops and materiel possible and provides maneuver space for subsequent operations." Forcible entry consists of: "amphibious assault, amphibious raid, airborne assault, air assault, or any combination thereof."

capability and capacity of the Engineer Special Brigades over time highlight the importance of repetition and the difficulty in developing expertise. Joint forcible entry is a concept the Army will use to penetrate enemy A2AD capability to achieve strategic and operational objectives against determined future adversaries.

The Joint Concept for Entry Operations states that "[e]ntry forces will envelop, infiltrate, and penetrate in and/or across multiple domains at select points of entry to place the enemy at an operational disadvantage."[129] The concept envisions land forces as being more than merely consumers of other joint forces, but a supporter of the joint force as well.[130] This requires land forces to provide capabilities in fires, intelligence, sustainment, protection, and mission command to joint forces in entry operations. More importantly, the concepts sets the condition for Army forces to conduct amphibious operations and operate inland as a part of a multi-domain approach.

Joint Publication (JP) 3-02, *Amphibious Operations,* states that a landing force is either a Marine Corps or Army unit task organized to conduct amphibious operations.[131] The Marine Corps, as a critical part of its theory of warfare, exercises and executes amphibious operations as a joint and combined team on a regular basis. The Army does not. When Army forces serve as the landing force for an amphibious operation, the Army may provide "intra-theater ship-to-shore transport to include landing craft, cargo handling, logistics, traffic control, and engineering capability."[132] The Army must prepare to conduct large-scale amphibious operations against a defended shore using joint capabilities, but lacks the capacity to conduct these operations.

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[129] US Joint Staff, *Joint Concept for Entry Operations,* 7 April 2014, 2, 19. The purposes to conduct entry operations are: "defeat threats to the access and use of the global commons; find, control, defeat, disable, and/or dispose of specific WMD threats; conduct other limited duration missions; assist populations and groups; establish a lodgment."

[130] Albert Palazzo and David Mclain, "Multi-Domain Battle: A New Concept for Land Forces," *War on the Rocks*, September 15, 2016, accessed February 18, 2017, https://waronthe rocks.com/2016/09/multi-domain-battle-a-new-concept-for-ground-forces/, 9.

[131] Joint Publication (JP) 3-02, *Amphibious Operations*, 18 July 2014, I-1.

[132] Ibid., II-8

The Army currently has a combined total of only five companies in the active and reserve components that can support a ship-to-shore or shore-to-shore amphibious assault.[133] These five companies operate as a part of expeditionary transportation brigades with a mission of delivering troops and equipment primarily in a permissive environment. These units do not have the robust capability or capacity that the Engineer Special Brigades delivered to the Joint Force during WWII, and simply expanding the capacity of these units does not provide the robust amphibious capability the Army needs.

Recommendations

The Army must be able to conduct amphibious forcible entry operations in the future. The problem the Army is facing is similar to the problem faced prior to and during WWII. Amphibious operations are distinctly tied to the Marine Corps and Navy. Any encroachment thereof will run up against the wall of inter-service rivalry. The Army should find ways either to remove the wall, work with the wall, or work around the wall. Army amphibious development should concentrate on organic amphibious force development, joint amphibious exercises, and

[133] US Army Force Management System Website, *FMSWeb*, Unit inventory, accessed February 20, 2017, https://fmsweb.fms.army.mil/unprotected/splash//. The 1098th Medium Boat Detachment and the 464th Medium Boat Company operate LCM Mod 8 watercraft. The 97th Heavy Watercraft Company, the 481st Heavy Watercraft Company, and the 824th Heavy Watercraft Company operate LCU-2000 watercraft. Program Executive Office, Combat Support and Combat Service Support, *Product Director Army Watercraft Systems Homepage*, accessed February 18, 2017, http://www.peocscss.army.mil/pddaws.html; Joint Publication (JP) 4-01.6, *Joint Logistics Over-the-Shore*, 27 November 2012, C-9-10; Army Techniques Publication (ATP) 4-15, *Army Watercraft Operations*, April 2015, 2-3-5. The Army also has eight Logistics Support Vessels which are self-deployeable, Roll-on/Roll-off (RORO), heavy lift vessels with a 2,000 ton payload capable of delivering twenty-four M1 Abrams tanks and a range of 5,500-8,200 nautical miles. The Landing Craft Mechanized (LCM) 8 has a capacity of fifty-three tons or sixty-two combat equipped soldiers with a range of up to 332 nautical miles. The LCM 8 equipped companies are capable of transporting 1,000 tons or 1,400 personnel twice daily. The Landing Craft Utility (LCU) 2000 has a capacity of 350 tons (five M1 Abrams tanks) or up to 250 combat equipped personnel with a range of 4,500 nautical miles. The heavy watercraft companies are capable of delivering 1,600 tons of supply or 3,200 personnel in a one time lift.

combined, multinational amphibious operations. Future war will be multi-domain and the Army should be able to operate within that framework.

The Army already has a limited amphibious footprint. Expanding this capability is critical. Development of multi-domain capability for a primarily land-centric force has not been possible with the budget restrictions of the last few years and with most extra dollars being spent on overseas contingency operations. With a new administration, the relaxation or removal of Budget Control Act restrictions is likely. To be able to conduct amphibious operations, as described in JP 3-02, the Army must develop this capability organically.[134] There is an existing framework for approving and funding amphibious capability development that should be capitalized on for long term sustainability.[135] Until this funding is approved, however, the Army must begin training now as part of a Joint Force solution.

Service rivalries and the politics of service proponency is the biggest hurdle facing amphibious capabilities development in the Army, but should not be a limit to development of Army institutional knowledge. The Marine Corps and Navy have control of amphibious technology development and funding for training exercises and are not likely to hand over control to Army units. The Army, however, should look to capitalize on needs as a critical component to Joint Force training opportunities. Providing robust theater engineer capability to beachhead development and construction, joint logistics over-the-shore (JLOTS) to sustain Marine Corps amphibious operations inland, and providing a brigade combat team as a land component follow-on force are all ways to get the Army involved in current exercises without encroaching too far onto Marine Corps roles and missions. There are many other options available. The Army must get involved in amphibious operations now in order to rebuild institutional knowledge that has

[134] JP 3-02, *Amphibious Operations*, I-1.

[135] Joseph Malone, "The Army and the Need for an Amphibious Capability," Master's thesis, US Army Command and General Staff College, 2015.

degraded to a point of near non-existence. The Transportation Corps, as the current Army amphibious proponent, should update its doctrine to incorporate WWII and Korean War era amphibious doctrine with current Army capability sets. [136] Current amphibious manuals for the Army are limited to watercraft employment in permissive environments. The new Army Doctrine Publication framework allows for branch control and continuous updates of Field Manuals and Army Techniques Publications. The Army should take advantage of this framework to develop capable doctrine for instituting amphibious operations regardless of the Army's capacity to execute it. Until service proponency issues can be resolved, the Army may need to look to outside sources to provide amphibious training opportunities.

The Army should capitalize on the amphibious capabilities of allies and partners to train in amphibious operations. The Australian Army, for instance, has an amphibious battalion and a separate amphibious boat unit with fifteen LCM-8 watercraft. The Australian Navy has an additional two LHD, one LSD, and seventeen additional landing craft.[137] Many other allies and partners have similar capabilities. These coalition partners provide unique capabilities that the Army cannot currently provide internally. If exercised consistently, the Army would be able to gain institutional knowledge of amphibious operations and garner closer relationships with key allies. These exercises would also serve to communicate the resolve and capabilities of a coalition to fight in an A2AD environment.

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[136] Boose, *Over the Shore*, 349.

[137] The International Institute for Strategic Studies, *The Military Balance*, vol. 117 (Oxfordshire, UK: Taylor and Francis Publishing, 2017), 272, accessed 26 February 2017, http://www.tandfonline.com/toc/tmib20/117/1?nav=tocList; AH II-6. Amphibious Assault Ship, Multipurpose, LHD, has a full-length flight deck and hangar to support helicopter, tilt-rotor and vertical/short takeoff and landing aircraft. Has well-decks to provide for ship-to-shore movement of landing craft and amphibious assault vehicles. Also serves as headquarters ship for command and control of amphibious assaults. Dock Landing Ship, LSD, lands troops, equipment, and supplies with landing craft and amphibious assault vehicles utilizing its well-deck. Also provides the ability to render limited docking and repair services to small boats and craft.

The Army must build an amphibious capability now to fight in non-permissive environments in the future. It is highly likely that any fight against a peer or near-peer enemy force will require amphibious landing in an A2AD environment. Without the institutional knowledge to conduct amphibious assaults, the Army will pay a high price to gain access. However, the Army has the ability now to start developing institutional knowledge and prepare for the future. The Army can prepare by developing organic amphibious capability as a long-term solution, supplementing existing Marine Corps and Navy exercises, rewriting and updating amphibious doctrine, and working with coalition partners and allies to conduct amphibious operations. These limited objectives provide a framework to achieve amphibious capability within the Army without overtaxing the force.

Conclusion

The Army and Navy have different objectives at war. The Navy focuses on control of sea lines of communication and extending operational reach. This focus lends Navy and Marine Corps amphibious employment to establishing sea bases, and short-term, expeditionary land-focused actions that capitalize on naval mobility and power at sea. The Army focuses on winning the land war. This focus means that when the Army reaches the shore, the amphibious operation is the first action of a long, sea- or air-sustained campaign that requires improvement and sustainment of the force overland. These objectives are complementary parts of the Joint Force menu of options that should work together when called upon, but the Army is currently unprepared.

The Army identified this capability gap prior to WWII and acted quickly to resolve the issue with the establishment of Engineer Special Brigades. These brigades proved to be critical enablers in both the Atlantic and Pacific theaters. Not only could the brigades land forces ashore, but they provided the Joint Force with the ideal platform to conduct sustained ground combat operations in support of army-level campaigns. General MacArthur used these amphibians in the

SWPA to dramatically increase the flexibility and tempo of actions in the theater. The Engineer Special Brigades provided Joint Force commanders unmatched capabilities and maximized the employment of the elements of operational art in designing and executing campaigns. The ability to extend operational reach, control tempo, mitigate risk and create opportunities, and control decisive points enhanced General MacArthur's SWPA campaigns to seize the initiative from the Japanese and decisively defeat them.

Engineer Special Brigades provided robust capabilities in WWII that enabled mass amphibious operations in support of land-focused campaigns. This requirement has not changed. For the Army to be able to successfully conduct amphibious operations, it needs to develop an organic amphibious capability and should work to develop institutional knowledge until that capability is fully operational. The future of the Joint Force depends on it.

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